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ABSTRACT

The Pacific Eisenhower Mathematics and Science Regional Consortium was established at Pacific Resources for Education and Learning (PREL) in October, 1992 and completed its second funding cycle in February 2001. The Consortium is a collaboration among PREL, the Curriculum Research and Development Group (CRDG) at the University of Hawaii, and the U.S.-affiliated Pacific Region's departments and ministries of education. The Pacific Consortium provided support for the improvement of mathematics and science education in the Pacific Region and across the nation. It built upon the regionally shared vision that all Pacific children will be scientifically and mathematically literate. The Consortium worked to improve mathematics and science curriculum, instruction, and assessment and to strengthen Pacific regional resources that enable sustained improvement. Progress towards achieving these goals was accomplished by coordinating mathematics and science resources, supporting the identification and implementation of standards-based mathematics and science instructional programs, and providing training and technical assistance. The Consortium worked throughout the Pacific Region to identify and carry out projects and activities that met its objectives and furthered local initiatives. The Pacific Consortium supported a variety of activities including the development of standards and frameworks; training and technical assistance to implement culturally appropriate professional-development programs and standards-based classroom practices; technology growth; and outreach efforts aimed at parents, community members, and others in the learning environment. This document contains the final performance reports. (ASK)

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PACIFIC RESOURCES FOR EDUCATION AND LEARNING

Promoting Educational Excellence

Pacific Eisenhower Mathematics and Science Regional Consortium

Award Number: R168R50023

Final Performance Report

October 1, 1995 – February 28, 2001

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Final Performance Report
October 1, 1995 - February 28, 2001

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R168R50023

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Pacific Eisenhower Mathematics and Science Regional Consortium

4. Recipient Information

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8. Authorized Representative Information

To the best of my knowledge and belief, all data in this performance report are true and correct.

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Pacific Eisenhower Mathematics and Science Regional Consortium
Pacific Resources for Education and Learning

Final Performance Report
October 1, 1995 – February 28, 2001

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II. Project Summary

The Pacific Eisenhower Mathematics and Science Regional Consortium was established at Pacific Resources for Education and Learning (PREL) in October 1992, and completed its second funding cycle in February 2001. The Consortium is a collaboration among PREL, the Curriculum Research and Development Group (CRDG) at the University of Hawaii, and the U.S.-affiliated Pacific Region's departments and ministries of education.

The Pacific Consortium provided support for the improvement of mathematics and science education in the Pacific Region and across the nation. It built upon the regionally shared vision that all Pacific children will be scientifically and mathematically literate. The Consortium worked to improve mathematics and science curriculum, instruction, and assessment, and to strengthen Pacific regional resources that enable sustained improvement. Progress toward achieving these goals was accomplished by coordinating mathematics and science resources, supporting the identification and implementation of standards-based mathematics and science instructional programs, and providing training and technical assistance.

The Consortium worked throughout the Pacific Region to identify and carry out projects and activities that met its objectives and furthered local initiatives. The Pacific Consortium supported a variety of activities including development of standards and frameworks; training and technical assistance to implement culturally appropriate professional development programs and standards-based classroom practices; technology growth; and outreach efforts aimed at parents, community members, and others in the learning environment. All these efforts were tailored to meet the unique individual needs of Pacific-based constituents. In addition, the work of the Pacific Consortium informed and was informed by various groups across the United States.

Throughout the 5 years, internal PREL structures and the Consortium's Regional Advisory Board provided oversight to ensure that the program was carried out in a manner which efficiently and effectively led to achieving its objects by providing high-quality services that met client needs and had lasting impact on the teaching and learning of mathematics and science.

III. Overview of the Pacific Consortium

This report provides a summary of the work of the Pacific Consortium between October 1, 1995 and February 28, 2001, and documents its progress towards achieving the objectives set forth in the approved application. Tables and charts appear on the facing pages to provide additional information and data.

The Consortium

The Pacific Mathematics and Science Regional Consortium was established at Pacific Resources for Education and Learning (PREL) in 1992 to provide opportunities and support for the improvement of teaching, learning, and assessment in mathematics and science in the U.S.-affiliated Pacific Region and across the nation. In 1995 PREL received a 5-year award, reauthorized under the Improving America's Schools Act of 1994, to continue the work of the Consortium through September 2000. This award was subsequently extended through February 2001.

Consortium Partners

PREL operated the Pacific Regional Consortium in collaboration with the Curriculum Research and Development Group (CRDG) at the University of Hawaii and the departments and ministries of education in American Samoa, the Commonwealth of the Northern Mariana Islands (CNMI), the Federated States of Micronesia (Chuuk, Kosrae, Pohnpei, Yap), Guam, Hawaii, the Republic of the Marshall Islands (RMI), and the Republic of Palau. All of these departments and ministries were represented on the Consortium's advisory board and the regional mathematics and science leadership team throughout the 5 years.

CRDG, through its subcontract with PREL, had been a collaborative partner since the Consortium's inception in 1992. PREL and CRDG each have individual goals, but in the arena of mathematics and science improvement, they worked together to create a whole that is much greater than its parts. The relationship between CRDG and the Consortium matured into a true collaboration that benefited both organizations and, more importantly, clients in the Pacific Region entities. The mathematics and science staffs of the two organizations met on a regular basis to design and plan work, produce materials and publications, co-present at conferences, and deliver training and technical assistance that was jointly developed and supported.

In addition to the key collaborators mentioned, the Consortium worked in close association with the Pacific Regional Educational Laboratory (REL), the Pacific Comprehensive Regional Assistance Center (PC), PRELSTAR (the Pacific-based distance-learning program), the National Network of Eisenhower

Table 1: Pacific Consortium Regional Advisory Board (09/11/00)

Ms. Laborday Atanoa
Middle School Teacher
American Samoa

Fr. James P. Croghan, S.J.
Director
Xavier High School

Mr. Henry Falan
Director of Education
State of Yap, FSM

Dr. Rita Hocog Inos
Commissioner of Education
CNMI

Iroij Michael Kabua
Traditional Leader
Chairman
Council of Mayors
RMI

Mr. Wilfred I. Kendall
Minister of Education
RMI

Reverend Billy G. Kuartei
Minister of Education
Republic of Palau

Ms. Helen Leebey
Teacher
Yap, FSM

Dr. Paul G. LeMahieu
Superintendent of
Education
Hawaii

Ms. Susan J. Moses
President
College of Micronesia
Pohnpei, FSM

Ms. Malua T. Peter
Representative
CNMI Legislature

Mr. Henry Robert
Director of Education
State of Kosrae, FSM

Dr. Sili Sataua
Director of Education
American Samoa

Mr. Casiano Shoniber
Director of Education
State of Pohnpei, FSM

Ms. Rosie Rivera
Tainatongo
Director of Education
Guam

Ms. Lorena Taitano
Secondary Teacher
Guam

Mr. Laurence Vogel
President & CEO
Y. Yata and Co.
Hawaii

Mrs. Lynne C. Waihee
President
Read To Me America
Hawaii

Mr. Surangel Whipps, Jr.
President & CEO
Surangel and Sons
Republic of Palau

Mr. Kangichy Welle
Executive Director
Chuuk State School System
State of Chuuk, FSM

Table 2: Pacific Mathematics and Science Leadership Team (08/01/00)

AMERICAN SAMOA	
Ms. Carolyn Scanlan, Mathematics Coordinator	Ms. Netini Sene, Science Coordinator
CNMI	
Mr. Nic Sablan, Mathematics Program Manager	Ms. Jackie Quitugua, Science Program Manager
CHUUK	
Mr. Peter James, Mathematics Specialist	Mr. Aurelio Sauder, Science Specialist
KOSRAE	
Mr. Tulen Peter, Mathematics Specialist	Mr. Tulensru Waguk, Science Specialist
POHNPEI	
Mr. Pernis Diopulus, Mathematics Specialist	Mr. Centry Paul, Science Specialist
YAP	
Ms. Ginny Fenenigog, Mathematics Specialist	Mr. Sam Baamafel, Science Specialist
GUAM	
Ms. Beatriz Camacho, Program Specialist - Mathematics	Ms. Sylvia T. Calvo, Program Consultant- Science
RMI	
Mr. Bedinin Joseph, Mathematics Specialist	Ms. Juanita Rilometo, Science Specialist
PALAU	
Ms. Hadleen Medalarak, Mathematics Specialist	Ms. Regina Mesebeluu, Science Specialist
HAWAII	
Ms. Kathleen Nishimura, State Mathematics Specialist	Mr. Justin Mew, State Science Specialist

FSM NATIONAL GOVERNMENT
Mr. Aier Willyander, FSM National Education Office

Regional Consortia and Clearinghouse (the Eisenhower Network) and others to coordinate efforts, maximize efficient resource utilization, and enhance impact.

The Work of the Consortium

The Pacific Consortium was established for the purposes of:

1. Coordinating mathematics and science resources within the Region;
2. Disseminating exemplary mathematics and science instructional materials;
3. Providing technical assistance for implementing teaching methods and assessment tools for use by elementary and secondary school students, teachers, and administrators.

To fulfill these goals, the Consortium established clear and measurable objectives that served as a framework for operations over the 5 years. The objectives were to:

1. Collaborate with other education service providers to develop the capacity of each Pacific entity to undertake and sustain systemic reform in mathematics and science education;
2. Establish criteria and priorities for providing direct services in mathematics and science education;
3. Draw on applied research to identify, adapt, field test, evaluate, and implement professional-development models appropriate for Pacific entities;
4. Draw on applied research to identify, adapt, field test, evaluate, and implement promising mathematics and science instructional programs for Pacific environments and cultures from preschool through grade 12;
5. Measure and document the impact of Consortium activities on students, teachers, administrators, and communities.

The Consortium ensured that the work it carried out to achieve these objectives was aligned with the needs of constituents and supported by educational communities in the U.S.-affiliated Pacific entities. One strategy to guarantee that this occurred was the active involvement of regional leaders in the Consortium's decision-making and service-delivery processes. The Regional Advisory Board (RAB) was formed specifically for this purpose. The board was made up of the Region's chief school officers and community representatives such as government officials, parents, teachers, and businesspersons (Table 1). The RAB met three times a year during the course of the grant to inform the work of the Consortium and set the general direction of its efforts.

The Pacific Mathematics and Science Leadership Team (M/S Team), a regional body consisting of mathematics and science curriculum specialists (Table 2), was the second key group concerned with the identification, design, and implementation of Consortium-supported efforts. Their sense of collaboration, ownership, and responsibility for mathematics and science improvement provided the impetus that

supported Consortium efforts throughout the Region. The M/S Team's vision for mathematics and science teaching and learning in the classrooms of each entity (see text box) drove the work of the Consortium.

M/S Team involvement in the Consortium at all levels enabled the Consortium's undertakings to be closely linked to important regional education initiatives as well as being tailored to meet the unique individual needs of constituencies in each entity.

The efforts of the Pacific Consortium extended well beyond the U.S.-affiliated Pacific islands. It both informed and was informed by the work of various groups across the country. The Consortium was an active participant in national efforts. As a member of the Eisenhower Network, the Pacific Consortium contributed to a variety of cross-consortia efforts. In addition, the Pacific Consortium staff regularly presented at national and regional conferences, published in journals of national significance, and contributed to a number of cross-organization national projects.

M/S Team Vision

We want our students to be literate in mathematics and science; problem solvers in a changing world; competitive, competent, and caring members of a global community; effective leaders capable of solving their own problems. We want our teachers to be more confident in their knowledge so they can become leaders and informed decision makers; promoters of our cultures; positive motivators in the classroom; supporters and caring linkers of students, families, and communities. We want teaching to become student centered, inquiry based, incremental and sequential, enabling students to build on their prior knowledge to develop understanding and capabilities. We want our classrooms to become learning centers both in reality and in attitude; to have adequate and available resources; and education to be inclusive of school, home, and community. We want our cultures to be valued and incorporated into the education of our students. We want our Leadership Team to become more knowledgeable, capable, and caring; lifelong learners continually developing new connections and understandings; able to collaborate and learn from one another.

Pacific Eisenhower Regional Consortium Leadership Team, 1995

Ensuring Quality

Improving the teaching and learning of mathematics and science requires high-quality training and technical assistance as well as resources. The Pacific Consortium was committed to high quality in both of these areas.

Products developed and disseminated by the Consortium, either in print or electronically, went through an extensive quality-assurance process (QAP). This process began with the clear identification of the needs to be addressed by the product, the intended audience, and the desired impact of the product on those receiving it. The QAP used by the Consortium required that each product be peer-reviewed for content, reviewed for cultural appropriateness and sensitivity; and reviewed by potential members of the target audience for usefulness and clarity. This process ensured that the products of the Pacific

Consortium were of high quality and of utility to the target audience.

The quality of professional development and technical-assistance activities was somewhat harder to determine. The Consortium provided opportunities which:

- Were designed and delivered with the most current research in mind;
- Were aligned with clearly defined needs and outcomes;
- Were tailored to the background and educational context of the intended participants;
- Emphasized challenging, standards-based content for all children while strengthening participants' content knowledge;
- Modeled effective standards-based teaching.

Each of these activities was followed by an evaluation. The evaluation consisted of written feedback from participants and extensive discussions with Leadership Team members and/or local partners. When activities were part of an on-going professional-development experience, feedback from participants and others regarding changes in practice was sought between events. This information, as well as other data collected in the course of the Consortium's work, enabled the successes and failures to inform the design of similar work in other places as well as future work with the same audience.

In addition to the ongoing monitoring that took place throughout the course of its work, the Pacific Consortium received feedback concerning its activities and their contribution to the improvement of mathematics and science education in the Region through the Consortia Program Interim Assessment (Summer 1998), the SRI Eisenhower Mathematics and Science Education Regional Consortia Program Evaluation (Summer and Fall 1998), the Eisenhower Network Cross-Consortia Client Surveys (Fall 1998 and Fall 1999), and extended interviews of M/S Team members (Fall 2000) who are very aware of the work of the Consortium, its work, its successes and remaining challenges.

All of these informed on-going refinement over the course of the current funding cycle. Although there were clearly challenges that remained, all of these studies indicated that the Pacific Consortium was successful in building networks, partnerships, and collaborative efforts that provided leadership and support for improvement efforts across the Region. Both the SRI Evaluation and the Client Survey indicated evidence of changes in teacher practice as a result of training and technical-assistance activities carried out by the Consortium.

Regional Networking and Cross-Fertilization

The Pacific Consortium was committed to ensuring that its work—the lessons learned and products that resulted—was shared across the Region. The Consortium staff and the Leadership Team members applied lessons learned on one occasion to the planning, design, and delivery associated with future work.

A priority throughout the funding period was the development of products that shared promising practices and tools furthering standards-based science and mathematics teaching and learning. These efforts ranged from informal sharing between team members and other partners to the dissemination and development of "formal products" across the Region and beyond. One vehicle for sharing information and building awareness was the Consortium newsletter, *Voyages in Mathematics and Science*.

The annual Pacific Education Conference (PEC) was another vehicle utilized by the Consortium to scale-up promising pieces of work from across the Region. The 1998 PEC featured over 25 Consortium-supported presentations. The vast majority of these were presentations by regional educators related to mathematics and science improvement efforts they designed or were leading.

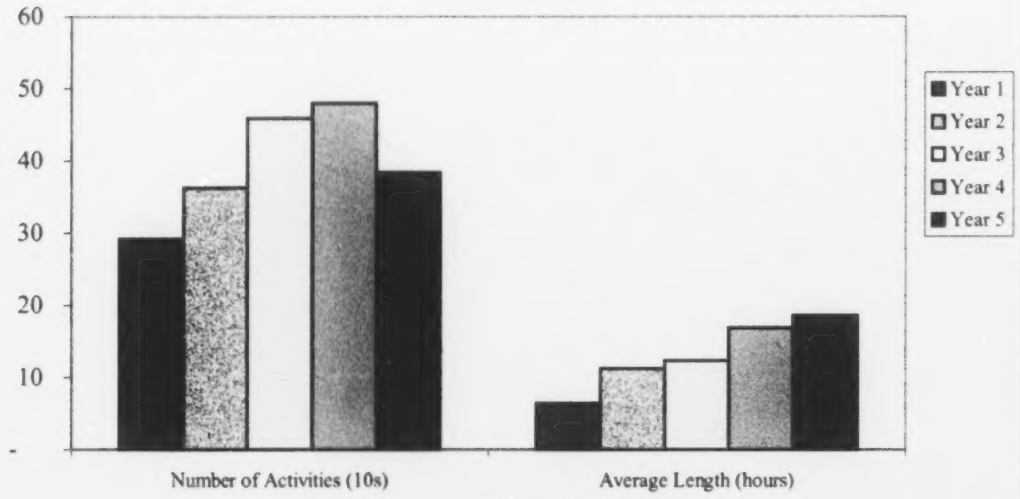
Highlights From Consortium Activities: October 1, 1995–February 28, 2001

The Pacific Consortium provided leadership for and contributed to the improvement of mathematics and science education across the Pacific Region. This was accomplished by providing training and technical assistance, supporting the identification and implementation of standards-based mathematics and science instructional programs, and fostering collaborations that brought together diverse resources for standards-based improvement. Recognizing that improvements in teaching and learning occur in schools and classrooms, and that change takes place over time, the Consortium increasingly focused its work on sustained school- and classroom-based efforts with extensive involvement by local partners over the 5-year period. The design and delivery of this work was informed by current research in the areas of mathematics and science education, student and adult learning, and effective professional development. In addition, the activities of the Pacific Consortium incorporated an understanding of the cultures and contexts in which teaching and learning take place in the Pacific.

Major accomplishments during the 5-year funding period include:

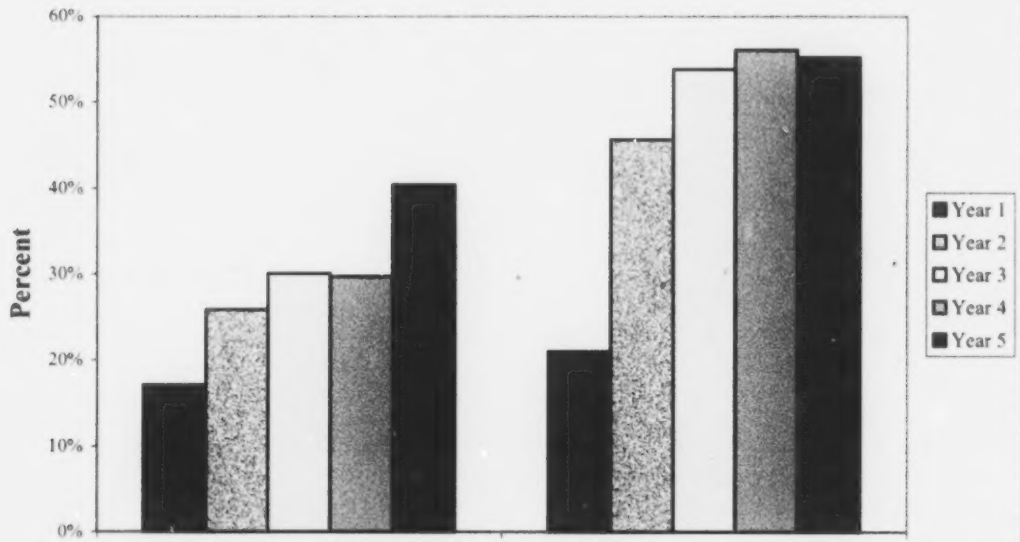
- A steady growth in the services provided by the Consortium—from 124,831 person-hours during Year 1 to 160,144 (annualized from 320,288 between February 1999 and February 2001) person-hours during Year 5.
- Significant support for the development of frameworks and performance standards and the adaptation of instructional materials in order to further standards-based improvement efforts.
- Support for the selection and adaptation of instructional programs consistent with entity mathematics and science frameworks. A portion of this effort was dedicated to the development of local programs, some of which utilized "first language" materials.
- Increased emphasis on training and technical assistance for the design and implementation of professional-development programs that further the inclusion of standards-based materials and practices in education systems across the Region. By the end of the funding cycle, work of this nature constituted more than half of Consortium activities and nearly three-quarters of the time spent with clients.

Figure 1: Number and Average Length of Activities
Years 1 - 5



Number and Average Length of Activities
(Number of Year 4 activities annualized for comparison purposes)

Figure 2: Sustained Activities and Technical Assistance
as Percent of All
Years 1 - 5



Sustained Activities and Workshops

- A greater focus on improving teaching and learning by supporting school and district-level educators. More than 70% of the Consortium's effort (as measured by client person-hours) was directed toward teachers and administrators from the Region's public and private schools. Much of this was in the form of long-term school-based initiatives.

- An increased prominence in sustained work within the Consortium's portfolio of activities between 1995 and 2001. By Year 5, 38% of all activities and 55% of the training and technical-assistance activities lasted more than 12 hours. The average length of professional development and TA activities increased to 23.6 hours by Year 5 (Figures 1 and 2).

- Professional development for mathematics and science leaders across the Region through the Pacific Educator In Residence (PEIR) Program; the active involvement of leaders in designing, delivering, and providing follow-up for Consortium-supported professional-development activities; and continued support for local leadership groups such as the CNMI Commonwealth Science Task Force. The on-going development of the M/S Team constituted a significant portion of efforts to develop internal capacity.

- Developing partnerships and other collaborative relationships to support mathematics and science improvement. During the 5-year period the percentage of activities involving collaborators increased from 80% to over 95%. These partnerships are in part responsible for the increase in services and, more importantly, furthered follow-up support and sustainability. These partners also came from a broader segment of the community over the course of the project.

- Increased involvement with local professional organizations, such as the Hawaii Science Teachers Association, Hawaii Council of Teachers of Mathematics, the Pacific Island Mathematics Association for Two-Year Colleges, and the Hawaii Association for Supervision and Curriculum Development.

- Support for school- and community-based improvement efforts through the Visions and Dreams Program; many of these initiatives involved community members and targeted remote islands that would otherwise not have received direct Consortium services.

- The continued development of a system of entity-based service centers to strengthen connections between the Consortium and its constituents and to enable more efficient and timely delivery of services. Service centers were opened in all nine of the entities outside of Hawaii during the 5-year period.

- The expanded involvement of the Pacific Consortium in mathematics and science improvement efforts at the national level. This included cross-consortium activities, national classroom-assessment training conferences, and presentations at national conferences.

- Scaling-up through conference presentations by Consortium staff and participants in Consortium activities including teams representing school/community-based efforts supported by the Visions and Dreams Program. The Consortium delivered or supported more than 100 presentations at conferences between October 1995 and September 2000. These included the Pacific Educational Conference, the Association for Supervision and Curriculum Development, American Education Research Association, IASA Conferences, National Educational Computing Conference the National Science Teachers Association, and the National Council of Teachers of Mathematics.

- Improved dissemination to inform clients and further the improvement of mathematics and science in the Region. Dissemination was often incorporated as part of sustained training and

Table 3: Person-Hours Contacted by Entity

Entity	Year 1	Year 2	Year 3	Year 4	Year 5
A Samoa	3,083	2,347	3,623	3,141	7,882
Chuuk	3,121	3,122	5,473	3,538	14,962
CNMI	2,491	7,642	5,260	5,726	9,218
Guam	4,163	5,020	9,757	15,328	11,082
Hawaii	112,873	72,594	75,027	41,101	72,561
Kosrae	2,022	2,185	5,327	3,269	8,639
RMI	4,785	8,301	17,127	24,396	8,606
Palau	1,513	2,087	3,950	2,689	5,223
Pohnpei	6,016	3,732	5,100	5,487	3,167
Yap	7,715	13,465	12,349	24,263	8,778
Other	4,212	1,186	11,621	30,995	10,026
Total	151,994	121,681	154,614	159,933	160,144

Figure 3: Activities by Primary Purpose

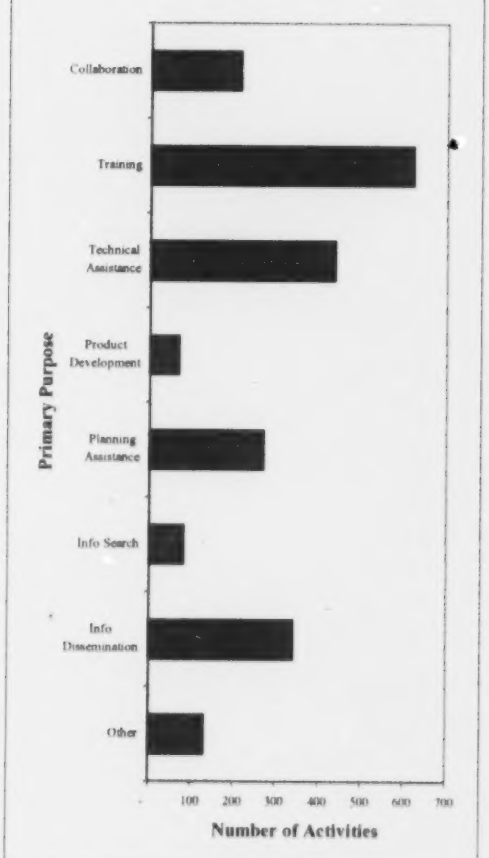
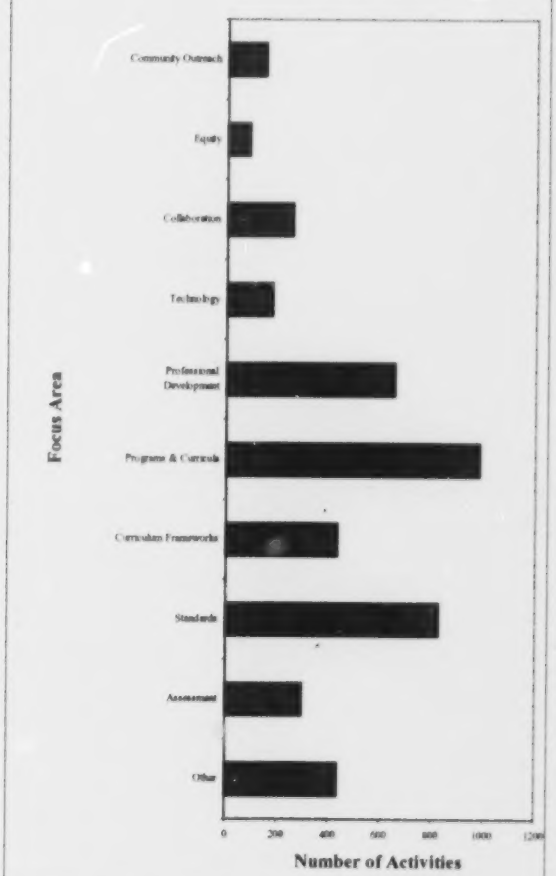


Figure 4: Activities by Focus Area



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technical-assistance activities. The variety of materials disseminated increased substantially over the 5 years, and almost one-third of the dissemination activities were carried out in conjunction with training and technical assistance initiatives. Electronic dissemination, via a variety of Internet-based mechanisms, grew from virtually nothing to over 160 hits per day.

- Implementation of a Visiting Scholars Program, which enabled Dr. Doug Grouws from the University of Iowa to spend 4 months with the Consortium providing training and technical assistance as well as helping to inform the Consortium's work on bringing about and documenting change in mathematics classrooms.
- Continued support in an effort to foster collaboration among leadership team members across the Region and to ensure their effective participation in the Consortium and other professional communities. Through Consortium support, the percentage of MS Team members with access to Internet and electronic communication grew from 20% to 100%.
- Support for a number of student-focused projects, including science fairs in Palau, Kosrae, and Pohnpei; and increased participation of Micronesian students in the Pacific Mathematics and Science Upward Bound Program based at Leeward Community College in Pearl City, Hawaii.

The activities highlighted above represent a sampling of the Consortium's work. These efforts provided educators across the Region (Table 3) with a wide variety of opportunities (Figures 3 and 4) to engage in efforts aimed at improving the teaching and learning of mathematics and science.

The following sections of this report provide a more detailed description of the Consortium's work over the 5-year period from October 1, 1995, through February 28, 2001. Each section addresses one of the Consortium's 5 objectives, describing projects and sustained activities as well as the implementation, quality, utility and outcomes of the Pacific Consortium activities. For simplicity's sake, dissemination is incorporated in Section 4.

Each section begins with a statement of objectives and desired outcomes by the year 2000. Also presented are appropriate excerpts from the "Detailed Activity Plan and Timeline" as presented in Appendix A of the grant proposal, along with a note referring to the corresponding sections of the approved grant application.

The Consortium has received feedback regarding the quality and utility of its work through a variety of sources. The data reported as performance data is derived from the Cross-Consortia Client Surveys (CCCS) administered in the fall of 1998 (130 respondents) and fall of 1999 (102 respondents), M/S Team Interviews (2000), and information from the Pacific Consortium Activity Database (PCAD) between March 1996 and February 2001. External sources include the Interim Assessments of the Eisenhower Regional Consortia for Mathematics and Science Education on June 15-17, 1998 and the evaluation conducted by SRI between 1997 and 2000.

IV. Collaboration

Collaborate with other education service providers for the purpose of strengthening the capacity of each Pacific entity, and enabling all of them to undertake and sustain standards-based systemic reform in mathematics and science education so that by the year 2000 there will be:

- Well-established collaborative relationships at the local, regional, national, and international levels that contribute to the ongoing improvement of mathematics and science education.
- Self-sustaining established networks that share human and material resources.
- An expanded role for parents and the community in mathematics- and science-education reform.
- Ongoing discussions that facilitate the continued development of shared understanding, vision, and trust within each entity and throughout the Region.

Collaboration (Activities as proposed)

NATIONAL

1.1 Collaborate with ENC in identifying and disseminating exemplary materials.
1.2 Collaborate with ENC to promote the effective use of technology.
1.3 Collaborate and coordinate with other mathematics and science regional consortia to improve math and science across the nation.
1.4 Collaborate and coordinate with organizations to increase the availability of informal education in the Region.
1.5 Collaborate and coordinate with organizations with expertise in mathematics, science, culture, and language to augment the Consortium's efforts.

REGIONAL

1.6 Collaborate and coordinate with other service providers in the Pacific Region.
1.7 Work with entities in the Region to increase the use of educational technologies.

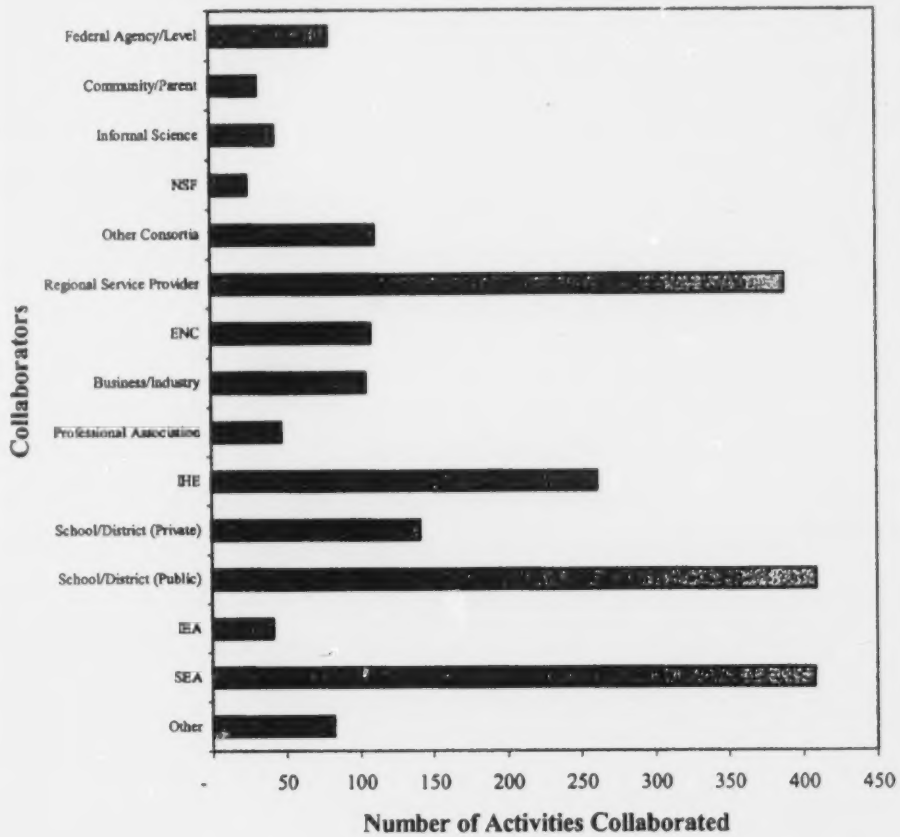
STATE / ENTITY

1.8 Act as a catalyst, bringing together people and programs to insure coordination of mathematics and science change-efforts with other large-scale reform initiatives within each Region.
1.9 Facilitate developing entity-based networks, including formal and informal educators, parents, community members, businesses and others to align Consortium activities with local needs and efforts and to elicit coordinated support in the effort.

Approved Application References: Part 3 - pages 6, 16-18.

Collaboration was a hallmark of the efforts of the Pacific Consortium. The Consortium would have been unable to achieve its objectives and assist the Pacific Region in moving toward its vision of education without significant support in the planning and delivery of its work. In addition, the sustainability of improvement is dependent upon lasting local and regional partnerships and alliances. Since 1995, the Consortium has actively sought to strengthen existing collaborative relationships and to develop others as part of its activities. It was recognized that such collaboration is critical to maximize the impact of relatively limited resources and to develop the support and commitment necessary to bring about systemic improvement.

Figure 5: Consortium Collaborators



Efforts to foster collaborative relationships were successfully undertaken on the national, regional, and entity levels (Figure 5). Collaboration was present in 75% percent of Consortium activities during Year 1. This percentage grew to over 85% by the end of the project period. A significant number of activities involved the Consortium in the role of catalyst for developing and strengthening collaborative relationships. Collaborative undertakings covered a wide variety of organizations and groups at numerous levels, ranging from international to local communities—some undertaken to meet focused, short-term needs and others to build a foundation of networks and relationships capable of supporting successful improvement efforts over time.

National Collaboration

The Consortium actively engaged in collaboration with national organizations to bring about the improvement of mathematics and science in the Region and across the nation.

ENC/Pacific Consortium Activities

The collaborative relationship between the Consortium and the Eisenhower National Clearinghouse for Mathematics and Science Education (ENC), developed during the first funding cycle, continued to be strong and beneficial to all involved. The Consortium operated the Pacific Eisenhower Technology Demonstration Site (Demo Site) on behalf of the ENC as well as Access Centers across the Region. The primary purpose of the Demo Site and Access Centers was inform educators' mathematics and science improvement efforts. During the first 4 years of its existence, the Demo Site rotated among different sites across the Region. Since 1997, it has been located at PREL's Guam Service Center. There are currently Access Centers in Hawaii, Palau, CNMI, RMI, Yap, and Kosrae. With the exception of Hawaii, where the centers are located at Honolulu Zoo and at the University of Hawaii at Manoa, centers are located in PREL's entity-based service centers. These centers are intended to provide educators and community members in the Region with ready access to high-quality mathematics- and science-education information and resources. The centers all provide Internet access to ENC and PREL online-resources and a number of them include fairly extensive print and video resource collections. The Consortium also offered schools and other interested groups the opportunity to host sessions focused specifically around ENC electronic and hard-copy resources. In Hawaii and American Samoa, where many teachers and classrooms have access to the Internet, the Consortium disseminated flyers and other informational pieces to increase educators awareness of the valuable resources available online at www.enc.org.

In addition to operating the Pacific Demo Site and Pacific Access Centers, the Consortium worked with ENC to disseminate a wide range of print materials to mathematics and science educators and other leaders throughout the Region. The Pacific Consortium disseminated more than 20,000 copies of various ENC publications to educators throughout the Region over the 5 years.

The Eisenhower Network

The Pacific Consortium actively participated in the Eisenhower Network throughout the funding period. As a network joining the regional consortia with each other and with ENC, the Eisenhower Network played a critical role in focusing the regional work of the various organizations into a national effort. It provided a vehicle for national collaboration and coordination, leveraging human resources and sharing development of tools and products. Involvement with the Eisenhower Network was a two-way relationship in which the Consortium contributed to and benefited from working with its sister organizations. The network fulfilled functions that improved the efficiency and effectiveness of the Consortium as well as efforts more directly focused upon services to clients, such as the co-development of products.

The Consortium's involvement in the development of the national data collection and reporting system improved activity monitoring and reporting within the Pacific Consortium and provided a nationally-consistent data set for reporting to the U.S. Department of Education and others. The Network's Evaluation Task Force, including evaluators and program specialists from the Pacific, also worked together to develop client surveys and interview protocols in order to better document the impact of various activities on clients. The information gained from surveys in 1998 and 1999 and M/S Team interviews in 2000 informed the on-going refinement of the Consortium's work.

The Pacific Consortium continued to contribute to and benefit from cross-consortium training and dissemination activities. The cross-consortium retreat in July 1998 provided an opportunity to share knowledge and gain new understanding as a result of interactions with peers from across the nation. The Third International Mathematics and Science Study (TIMSS) was the focus of extensive Eisenhower Network activities. Through the cross-consortia *TIMSS Resource Training*, the Consortium developed a cadre to carry out TIMSS-related activities in the Region. This team went on to make presentations at the several regional Pacific Educators' Conferences (PECs) and entity conferences in Hawaii, Guam, Chuuk, and American Samoa. The *TIMSS: Reactions and Resources* telecast is a further example of the benefits of sharing resources across the regional consortia. Because of satellite "foot prints," time zones, and geography, the only part of the Pacific Region that was able to view the telecast live was Hawaii, and even then it took place at 8 o'clock on Monday morning—not an ideal time for teachers and school administrators. To alleviate this problem, the Consortium disseminated a taped version of the teleconference to schools in Hawaii and other parts of the Region. The taped telecast was also part of a series of TIMSS sessions presented at the 1998 PEC.

Specific products produced by individual consortia were useful to the Pacific Consortium and its clients. The *Learning with Technology* program developed in the North Central Region formed the basis of technology-integration efforts in Hawaii and American Samoa. The TIMSS sourcebooks produced by

the Mid-Atlantic Eisenhower Consortium were made available across the nation through the Eisenhower Network. These were seen as valuable resources by teachers in the Pacific, particularly in Hawaii and Guam.

The Consortium actively participated on committees developing equity, assessment, and professional-development materials. The professional-development group designed and disseminated a professional development CD-ROM, *Blueprints*, to provide educators with ready access to effective professional-development models. The equity task force developed an equity compendium for dissemination through the consortia network. This compendium was released in hardcopy and, with the assistance of ENC, in CD-ROM format. These 2 products, and others made available through the network, were used extensively by the Pacific Consortium and contributed to its work.

Other National Partnerships

The Consortium actively participated as a collaborative partner in a number of national efforts outside of the Eisenhower Network arena. These include partnerships with WestEd, the Laboratory Network Program (LNP), the GLOBE program, and the Oregon Museum of Science and Industry.

The importance of classroom assessment in the Pacific Region drove the Consortium's continued involvement in national assessment efforts. The Pacific Consortium was actively involved in the development of the original toolkit as part of the LNP between 1993 and 1995. This experience proved to be a worthwhile professional-development activity for participating staff, resulting in a useful tool for assessment work across the Region. The work of the Consortium, in collaboration with the REL served the Pacific and many other organizations, and led to the revision and enhancement of the original toolkit and the release of *A Toolkit for Professional Developers: Assessment 98*. The Pacific Consortium took lead responsibility in the development of a language and culture strand to enhance the usefulness of *Toolkit '98* when working with diverse populations across the country. Subsequent to the release of *Toolkit '98*, the Pacific Consortium co-sponsored two national and four regional training sessions. The new toolkit became the basis of a number of classroom-assessment institutes for Hawaii educators.

The Pacific Regional Consortium acted as a franchisee of the NASA/NOAA Global Learning and Observations to Benefit the Environment (GLOBE) Program in the Pacific. The GLOBE Program provides students with the opportunity to conduct hands-on environmental science studies, collect and analyze data, and share this information electronically with scientists and schools around the world. As a franchisee, the Consortium was responsible for working with ministries/ departments in the Region to recruit GLOBE schools, train GLOBE teachers, and mentor them in the GLOBE program in the Region. The decision to become a GLOBE franchisee was based upon the quality of the program, the "standards-based nature" of the scientific studies in which participating students engaged, and the meaningful use of telecommunications technology encouraged by the GLOBE model. As a result of the rapidly increasing

availability of Internet access in population centers across the Region, electronic participation in GLOBE became possible for many schools. The training of the Region's first cadre of GLOBE teachers took place at Guam Community College in February 1997. The implementation of GLOBE was delayed because of slower-than-expected development of the technology infrastructure, but training activities were reinstituted with activities in Yap and American Samoa in 2000.

Over the 5-year project period, the Consortium acted as an agent for a variety of national programs, disseminating information concerning programs designed to further the improvement of mathematics and science teaching and learning. In some instances, the Consortium was a designated partner, while in others it supported the participation of educators from the Pacific Region. Between 1995 and 1998 the Pacific Consortium was a network partner in the National Science and Technology Week (NSTW) Network: NSTW was a joint Oregon Museum of Science and Industry (OMSI)/NSF effort to increase appreciation for the importance of science and engineering. The NSTW Network was a coalition established to help promote science, mathematics, and technology across the nation by providing NSTW materials and related resources to teachers, parents, and other educators. As a network partner, the Consortium disseminated NSTW materials to more than 1,400 teachers annually throughout the Region, and provided both media and Internet exposure for NSTW. As part of this effort, the Consortium collaborated with the Honolulu Zoo to distribute additional NSTW packets to interested parents and community members. This partnership ended when the NSTW network was downsized and dissemination efforts consolidated.

Equity, language, and culture were of major importance to the work of the Pacific Consortium, and these interests led to participation in a number of other national collaborations. The Consortium has developed a partnership with WestEd focusing on issues of language, culture, and equity in mathematics and science education. Joint initiatives included the *Science for Linguistic Inclusion* project funded by the NSF, and the development of materials for equitable classroom assessment practices in culturally diverse environments.

Regional and Entity Collaboration

Regional and local collaborations were critical to providing clients with coordinated service delivery that met their needs and led to the development and strengthening of relationships that were supportive of sustained improvement.

The Curriculum Research and Development Group (CRDG) at the University of Hawaii remained a key partner in the Pacific Consortium. Through CRDG, the Consortium had access to an outstanding source of mathematics- and science-education expertise and exemplary instructional materials. Together, CRDG and the Consortium provided the Region with "cutting-edge" training and technical assistance to

meet framework, training, and curriculum-development needs. The 2 organizations offered the Region extensive support for the implementation of exemplary curricula and professional-development programs.

The Consortium also worked to strengthen its relationship with other institutions of higher education in the Region and to foster more substantive collaboration between and among local DOEs and IHEs throughout the Region. The number of activities involving IHE collaborators (excluding activities involving CRDG/UH) increased steadily over the funding period. These included co-support of content and pedagogy courses and co-hosting topically focused institutes. For example, the College of the Marshall Islands (CMI) hosted the Pacific Eisenhower Technology Demo Site, and Consortium staff and CMI-Gugugu Campus staff co-taught a series of summer courses as part of *Project Al Maron* on Ebeye in the northern Marshall Islands. During the 5 years, the Consortium engaged in collaborative projects of one type or another with every IHE in the Region. Project DELTA, a NSF-funded and Consortium-supported middle-school mathematics initiative, probably had the greatest impact in this area. Through this project, PREL brought together teams representing IHE and DOE mathematics educators from all 10 entities in the Region to receive professional development and design and deliver local institutes for grade 4–8 mathematics teachers. These teams appear to be the foundation of lasting collaboration at the local level.

In order to leverage resources and ensure that efforts were coordinated, the Pacific Consortium collaborated on an on-going basis with other federally funded service providers working in the Pacific. The Consortium and other programs based at PREL—the REL, PC, and PRELSTAR—undertook numerous joint technical assistance, professional-development and product-development efforts. These included school-based initiatives such as *Project Al Maron* in the RMI, a Pacific regional technology-planning conference to further the effective educational application of emerging technologies, regional and sub-regional assessment conferences, the development of products such as *Weaving Standards Into Instruction*, the Pacific Algebra Network, and an educational leadership video series. In April 1998, PRELStar, the REL, the PC, the Consortium, and the California-based Technology Assistance Center for the Southwest and Pacific co-sponsored the first regional technology-planning conference. The 5-day Educational Technology for the Pacific Region conference, which convened members of the Region's education community to examine educational opportunities available through technology, serves as an outstanding example of a variety of federally funded service providers collaborating to meet a need that none could have met alone. The conference focused on establishing connectivity, selecting appropriate hardware, reviewing computer-based instructional resources, and designing professional-development opportunities to prepare teachers to use technology in the classroom.

Collaboration with the PRELStar distance-learning program affected the way that the Consortium delivered services across the Region. PRELSTAR and the Consortium jointly supported educational

science programming via telecast in Hawaii and videotape throughout the Region. The programs worked together to obtain the broadcast and duplication rights to the award-winning *New Explorers* series. This series contains a total of 68 video programs—many with teacher-support materials—that profile scientists at work. Targeting 4th through 8th graders, *New Explorers* aims to teach science, build critical thinking skills, and interest students in taking science courses in the future and possibly pursuing science as a career. Although technological development did not occur as rapidly as expected, the Consortium was able to utilize the PRELStar-supported video-conferencing networks in the course of its work with some entities near the end of the funding period.

The departments and ministries of education (DOEs) in the Region were the Consortium's most important collaborators. The chief school officers served on the Regional Advisory Board, their mathematics and science specialists served on the M/S Team, and their teachers and schools were, directly or indirectly, the primary target of all of the Consortium's efforts. This relationship is particularly important in the Pacific because the educational structure provides little, if any, meaningful distinction between state, intermediate, district, and local agencies. Therefore, entity-level DOEs have direct control of schools and instruction. The Consortium's collaboration with educational agencies fell into two distinct categories: planning and delivering services in an effective manner, and efforts to further collaboration within each DOE, and among the DOEs and others, to support the systemic improvement of mathematics and science education. The Consortium made a commitment to identify, plan, and deliver 100% of its entity-based activities in consultation with the relevant DOE. The realization of this commitment was reflected in the 95% rate of collaboration associated with its activities. As a result, the work of the Consortium was always closely linked to important local initiatives. In addition to strengthening the work of the Consortium, these collaborative relationships resulted in significant leveraging of resources. PREL's entity-based service centers are collaborative efforts made possible by the fact that the respective DOEs provided facilities, and in some cases support services, at no cost to the Consortium. A sense of regional identity and a shared vision for Pacific children resulted in an increasing number of DOE-sanctioned cross-entity collaborations: science and mathematics leaders from across the Region conducted professional-development workshops for host-entity teachers in conjunction with M/S Team meetings; entities requested and sponsored cross-entity framework development and training activities; and the Consortium supported the cross-entity work of a number of exemplary educators. Guam and CNMI, having similar needs, cultures, and geographical proximity, now undertake joint activities on an on-going basis.

The Pacific Region is an area in transition as the freely-associated states—the Federated States of Micronesia, the Republic of the Marshall Islands, and the Republic of Palau—continue to develop relationships with their neighbor nations. This trend is manifested in projects such as the FSM-Australia

Science Education Project (FASE), the RMI/University of the South Pacific (USP) Joint Education Project, and the work of the South Pacific Board of Educational Assessment (SPBEA) to develop student assessments in the Marshall Islands. The arena of international collaboration continued to be a challenge for a variety of reasons, but the Consortium actively sought collaboration on an informal basis whenever possible. Activities of this type included training and technical assistance to FSM educators as they continue to implement the FASE elementary science curriculum, participating with SPBEA in assessment-design conferences in RMI, working with Asian Development Bank curriculum-development consultants, and attending the UNESCO/USP Institute of Education Innovations in Science, Mathematics and Technology Seminar in Suva, Fiji. These collaborative efforts increased awareness and understanding among groups with the a common goal of improving curriculum, instruction, and assessment in mathematics and science in the Pacific Region. Marine science and environmental education were two high-priority topics shared across the Region. The University of the South Pacific (USP), the University of Hawaii, the South Pacific Regional Environmental Programme (SPREP), and the Consortium were able to obtain support from UNESCO and the governments of Australia, New Zealand, and Denmark to co-sponsor the Pacific Environmental Education Conference in June 1998. This conference brought together teams—including government-agency environmental educators, environmentally oriented non-government organizations, and formal science educators representing more than 20 Pacific-island jurisdictions—to meet, share, and plan both regionally and locally for the first time ever. This effort was important for a number of reasons. First, maintaining sustainable environments is a critical issue for all island entities, and this event provided a unique opportunity to share strategies and ideas. Second, because of the focus of the conference and its regional nature, doors were opened for leveraging new resources to support mathematics, science, and environmental education improvement efforts in the Region. Third, and perhaps most importantly, PREL, USP, and SPREP developed a collaborative relationship with the potential to support shared efforts across the "shrinking Pacific." The conference resulted in a number of new, environmentally focused activities in the Region such as the *Kan Sihk Kosrae* environmental education program in Kosrae co-supported by the Consortium, a variety of Kosrae State government agencies, and a U.S. mainland-based environmental education foundation.

Partnerships with Business and Informal Science Educators

A major accomplishment over the 5 years was the increased involvement of the business community and informal educators in Consortium activities. Bishop Museum, the Honolulu Zoo, RARE Center, Pacific Island Network, the Nature Conservancy, GTE Hawaiian Tel, Hawaii Medical Service Association (HMSA), Foodmaker/Jack In The Box—Hawaii, Continental Airlines, and others formed partnerships with the Consortium during the course of the funding period. Although many of these

relationships were short-term, they were timely, focused, and had significant positive impact on the Consortium's ability to meet specific needs.

Early in the funding cycle, the Consortium convened meetings with informal educators in Hawaii to conduct needs-sensing. At these meetings there was consensus that the greatest need was to develop and disseminate information outlining the informal education opportunities available in the state. The Consortium facilitated the development process and obtained corporate sponsorship from HMSA to fund printing and dissemination of the *Hawaii Guide to Informal Education Opportunities* throughout the state. It became available online in late 1997. Informal educators were also committed to having a significant presence at various teacher "gatherings" throughout the state, so print release occurred in August 1998 to coincide with the state YMCA Teacher Outreach Day and the Pacific Education Conference on Kauai.

Solve It Now! was a collaborative project involving the Consortium, Foodmaker/Jack In The Box—Hawaii, and the Hawaii DOE (HIDOE) from 1995 through 1998. Foodmaker/Jack In The Box—Hawaii recognized that mathematics is an integral part of everyday life and worked with the Consortium and the HIDOE in a program designed to motivate children by rewarding them for their standards-based mathematics accomplishments. Rewards consisted of certificates for Jack in the Box products earned by consistently meeting problem-solving task goals established by classroom teachers. The intent was to be link problems to classroom instruction and to emphasize the first four National Council of Teachers of Mathematics (NCTM) Standards—mathematics as problem solving, mathematics as communication, mathematics as reasoning, and mathematical connections. Following a pilot year, *Solve It Now!* involved 104 classrooms on the island of Oahu. The Consortium provided professional development for participating teachers and produced teacher-support materials that included exemplary tasks and possible solutions submitted by teachers and students in the pilot classrooms. The corporate reorganization of Foodmaker/Jack In The Box–Hawaii resulted in the loss of their support for the effort in 1999 but the project was able to support teachers and motivate students during their initial encounters with standards-based mathematics.

Numerous other businesses and organizations supported the work of the Consortium over the 5 years. Several publishers provided instructional materials free or at reduced cost. Continental and Hawaiian Airlines provided drastically reduced airfares for students participating in the Pacific Mathematics and Science Upward Bound Program in Hawaii, thus enabling the Consortium to support 5 to 10 additional participants each year.

One of the Consortium's major technology-related efforts during the 5-year period was *Effectively Utilizing Technology To Support And Enhance Learning: A Neighbor Islands Technology Initiative (NITI)*. The Consortium sought and received a grant from GTE Hawaiian Tel to develop a cadre of teachers capable of supporting each other as they gained Internet access in their classrooms. The effort

was undertaken to advance the effective use of technology, particularly computer-based telecommunications capability, as a way of enhancing teaching and learning in Hawaii's Neighbor Island classrooms. The initiative utilized the North Central Regional Educational Laboratory's *Learning with Technology* program, with some adaptations by local facilitators. A total of more than 100 hours of facilitator training, consisting of one-day seminars and follow-up training—including the certification of an 11-member cadre of trainers from the islands of Hawaii, Maui, Molokai, Lanai, and Kauai—was provided. Ten of the eleven trainers conducted follow-up sessions, and initial reviews of evaluation data indicated that they were effectively replicating the program. To leverage resources, the training of a cadre representing Honolulu schools was "piggy-backed" onto the NITI training of trainers. The Honolulu cadre went on to provide more than 70 hours of training.

Science classrooms across the Pacific are typically "resource poor" but many are within site of the beach. The *Pathfinder Marine Education Program* was a collaborative effort of the Consortium and the Pacific Island Network, an UH-based organization. *Pathfinder* brought together 6th-9th grade science teachers, practicing scientists, and those involved in designing instructional programs for annual two-week institutes focused on utilizing the marine environment as a teaching tool. The institutes were designed to increase the participants' understanding of marine science, build links and relationships with "real science," increase understanding of science standards, and engage participants in the development of standards-based instructional units built around "critical questions" related to the marine environment. The institute was held in a different location in the Region each year and served over 150 participants between 1995 and 2000. The units developed during the institutes were field tested in classrooms across the Region and a set of activities reflecting key areas of marine science was published in early 2001. These will soon be available via Internet.

The Pacific Region has a very rich oral tradition and many examples of mathematics and science applied through "local technologies." The Consortium was able to work with Bishop Museum to sponsor a series of presentations in Hawaii and at the 1997 Pacific Educational Conference in RMI linking objects and storytelling to science teaching. These presentations, *Teaching With Objects* and *Teaching Through Storytelling*, were developed to provide educators with strategies enabling them to teach science and other content areas using stories and objects from island societies. This effort included technical assistance to the Alele Museum in RMI. The assistance focused on the development of similar presentations for use in formal and informal settings in the Marshalls.

In the Region beyond Hawaii, there are no science centers, and "informal education" takes on a different meaning. In these areas, the Consortium worked with a variety of agencies and education organizations. For example, in Pohnpei, the Consortium brought together the Nature Conservancy and the DOE. Together they developed an in-school program related to farming practices and their impact on the

environment. The Consortium supported the publication of teaching posters printed in Pohnpeian and English for the project. In Kosrae, the DOE, Environmental Protection Agency, RARE Conservation Center, and the Consortium worked together to carry out a 2-year community-wide environmental education effort that includes first-language instructional materials for grades 1-3 and 6-12.

Outcomes and Impact

As a result of the Consortium's efforts in developing and sustaining partnerships, both of the performance indicators in this area were met. Over the 5 years, more than 90% of the Consortium's activities included collaborators from one or more stakeholder groups in planning, product development, and/or service delivery. Of those who participated in Consortium activities in this manner, 87% reported that value was added in one or more of the following ways: strengthening relationships; increasing service coordination; increasing access to resources; or leveraging resources.

The Consortium's collaboration and the community-building it fostered across the Region had a very positive impact on the mathematics and science education in the Region. Both the Interim Assessment and SRI reports recognized the community-building role that the Consortium played. The relationship with CRDG was identified as truly collaborative and an ideal relationship for both PREL and CRDG, bringing together the expertise of both organizations in mathematics and science reform issues, curriculum development, and professional development.

Clients were nearly unanimous in their belief that the collaboration fostered by the Consortium led to more coordinated services, the leveraging of resources, and enabling activities to occur that would have otherwise not taken place. On surveys and when interviewed, all respondents indicated the collaboration and networking facilitated by the Consortium assisted them in carrying out their work more effectively. More than 80% of those who responded believed that collaboration successfully leveraged resources to increase impact. The Consortium was viewed as somewhat less successful in its attempts to build networks which influenced educational policy. Clients have indicated that the greatest Consortium impact on policy has been through grassroots efforts resulting from school-community-government efforts begun as part of Visions and Dreams supported projects.

The best summary of the impact of the Consortium's work in this area comes from a client who said, "Before collaboration with the Consortium, I had worked in isolation. By collaboration with the Consortium I was able to build relationships with other agencies which have benefited teachers and students. Our collaboration has successfully navigated a rocky start to achieve true cooperation at all levels."

Table 4: Criteria for Direct Services

Activities supported by the Consortium, including those within the Visions and Dreams Program:

- are consistent with the goals of the Consortium and contribute to achieving the Consortium's identified objectives.
- include plans for significant follow-up and long-term professional development opportunities.
- are consistent with the entity initiatives.
- develop and strengthen local expertise and capacity.
- are collaborative including such groups as parents, community members, informal educators, higher education providers, and others as appropriate.
- utilize the talents and expertise of local and/or regional resources as appropriate.
- recognize and honor local environments and cultures.
- involve institutions of higher education and contribute to the formal education and certification of teachers as appropriate.
- include indicators of success and a plan for evaluation to determine effectiveness and impact.
- include plans for how to sustain high-quality programs and practices after Consortium funding ends.

Table 5: Criteria for Instructional Programs and Focused Dissemination

The Consortium conducts "focused dissemination" in response to requests from clients and as part of technical assistance and professional development activities. Materials and programs disseminated by the Consortium as part of its focused efforts meet the following criteria. They must:

- be compatible with the *Pacific Standards for Excellence* and support the implementation of entity standards and frameworks.
- be consistent with and connected to current research about teaching and learning.
- be aligned with and support the attainment of long-term regional and entity goals.
- support the Consortium's professional development activities.
- enable the further strengthening of local and regional expertise and capacity.
- promote practices and processes likely to lead to improved teaching and learning.
- be inviting and accessible to the intended audience.
- encourage programs and practices which are sustainable in the local educational context.
- (for instructional programs including curricula, teaching, and assessment materials) be supported by evidence of improved student engagement and performance in mathematics and science.

V. Criteria, Priorities, and Planning

Establish criteria and priorities, and use these criteria for decision-making tied to local and regional priorities and needs so that, by the year 2000, there will be:

- Processes for developing mathematics and science criteria that are embedded in local/regional priorities, needs, and realities.
- Expanded capabilities for thoughtfully establishing criteria and using criteria in decision-making.
- Criteria for local and regional mathematics and science decision making.

Criteria, Priorities, and Planning (Activities as proposed)

2.1 Collaborate to establish criteria and priorities for providing services to entities in the Region.
2.2 Plan and implement specific activities based on the criteria and priorities.

Approved Application References: Part 3 - pages 6, 7, 9, and 18. Appendices G, H, and I.

Systematic and coordinated planning was a major task during the first 18 months of the funding cycle and remained a component of work throughout the 5 years. Achievement of the goals of the Pacific Consortium, with the limited funding available, required that activities be clearly focused on the desired outcomes, well-planned and coordinated. Strategic planning and decision making were multiple-part processes. The processes involved a variety of considerations including:

- Needs-sensing, decision making and planning to determine what work would be undertaken;
- Decisions concerning the process by which to meet the identified needs based on knowledge of the context in which the work would be carried out, current research about teaching both student and adult learners, and past experience;
- Decisions regarding the engagement of partners to support the effort;
- Utilization of ongoing assessment in the course of a project to inform future efforts in that project and similar projects in other places.

The Regional Advisory Board's responsibilities included setting and reviewing the policies and priorities needed to effect systemic reform and the "scaling up" of the Consortium's work. The Advisory Board held its first meeting of the funding cycle in November 1995. At this meeting, the board indicated that the Consortium should continue to identify and carry out direct services with the input and support of the M/S Team members in consultation with their chief school officers. Building upon work drafted during discussions throughout the Region in April 1995, the RAB approved final criteria and priorities (Table 4) for determining activities the Consortium should engage in and support beginning in November 1996. These were periodically reviewed to ensure that Consortium efforts were addressing purposes and

Figure 6: Focus of Activities Serving American Samoa

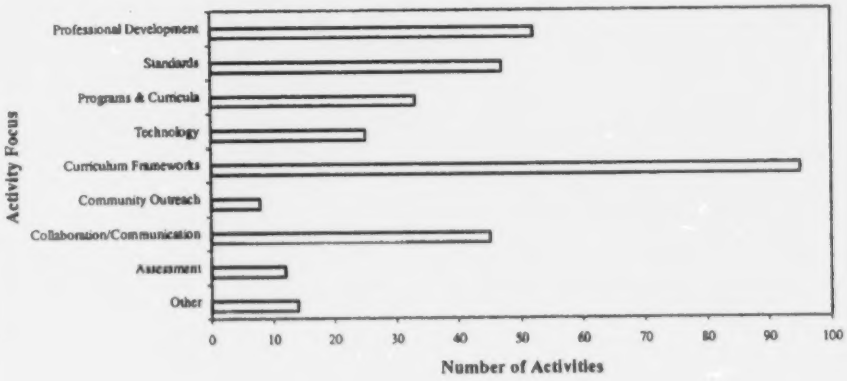
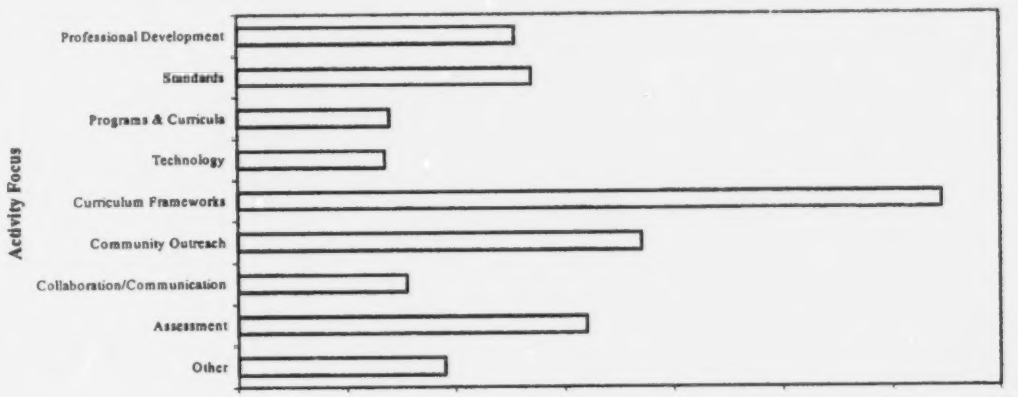


Figure 7: Focus of Activities Serving CNMI



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needs of clients in the Region. Although these decision-making guidelines remained essentially unchanged, there were two significant additions. In mid-1998 the question "Is this likely to make a difference in teaching and learning?" became the Consortium's "core question" and the primary question asked during activity-related discussions; the design considerations listed on page 5 were added to clarify decision-making. Later in the same year, criteria for making decisions regarding the selection and support for instructional programs and dissemination materials (Table 5 facing the previous page) were added with input from and the approval of the RAB and M/S Team.

Meetings with the chief school officers, curriculum and instruction chiefs, and the M/S Team, shortly thereafter, led to a shared understanding of the Consortium's scope of work and refinement of the processes to be employed for planning and implementation. As a result of these meetings, entity-specific criteria and priorities were established for identifying work to be supported by the Consortium. Links between mathematics and science improvement initiatives and other reform efforts already underway in the Region were also clarified. The Pacific Curriculum and Instruction Council (a regional group of curriculum and instruction leaders), along with the RAB and M/S Team were part these process throughout the project period.

By the fall of 1996 each entity had identified and formally accepted high-need priority areas related to the teaching and learning of mathematics and science. The identified priorities for each entity are listed below. The figures on the facing pages depict the foci of Consortium activities by entity during the funding period.

American Samoa (Figure 6)

- Develop and implement frameworks and performance standards across the system.
- Design assessment and evaluation tools and processes for students, teachers, schools, and the overall education system.
- Design and implement procedures and materials to integrate computer and telecommunications technology into classroom instruction.
- Increase parental involvement in education, particularly at the elementary level.
- Strengthen the knowledge base and leadership skills of key mathematics and science personnel.

Commonwealth of the Northern Mariana Islands (Figure 7)

- Align instructional programs and assessment mechanisms with the CNMI mathematics and science performance standards.
- Support the implementation of standards-based curricula.
- Develop a system-wide assessment and evaluation process for students, teachers, administrators, and support-service providers.
- Continue the professional development of local education leaders.

Figure 8: Focus of Activities Serving FSM ~ Chuuk

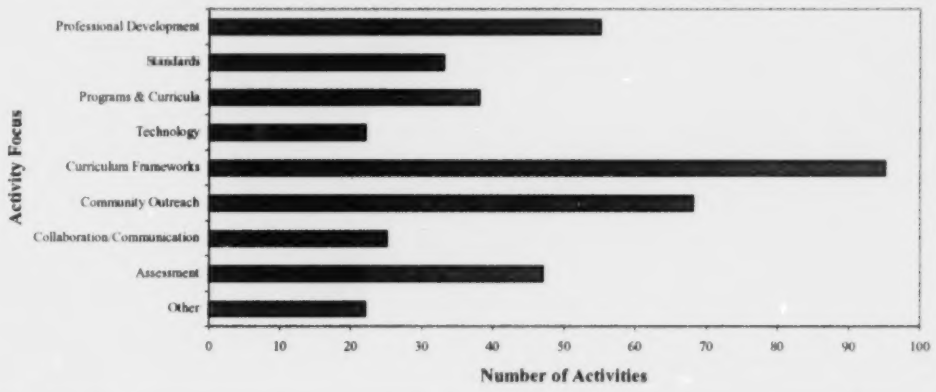


Figure 9: Focus of Activities Serving FSM ~ Kosrae

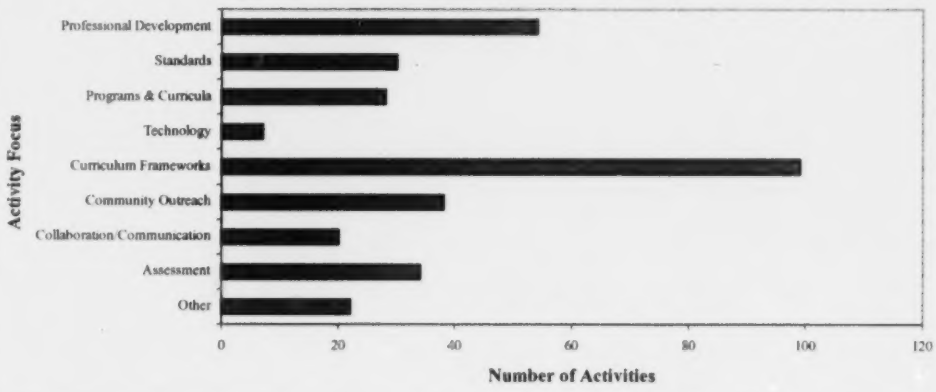
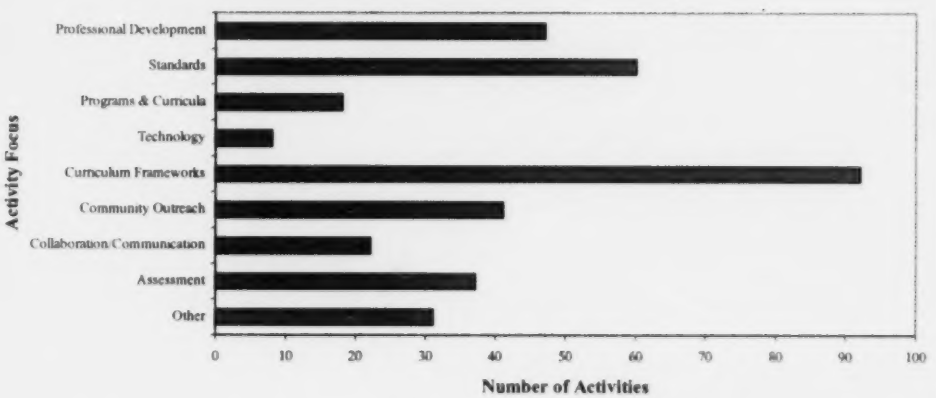


Figure 10: Focus of Activities Serving FSM ~ Pohnpei



- Address the program and facilities' concerns raised during the school accreditation process.

FSM ~ Chuuk (Figure 8)

- Improve mathematics teaching and learning in the elementary and secondary schools by updating curriculum, developing relevant instructional materials, integrating cultural mathematics and science, and improving professional development opportunities for all Chuuk educators.
- Provide technical assistance for the alignment of mathematics curriculum with *Pacific Standards for Excellence in Mathematics* (PREL, 1995).
- Develop and align elementary and secondary science standards in coordination with other curricular areas and with the Pacific Region Effective and Successful Schools (PRESS) process.
- Implement Pacific and state standards in mathematics and science content, teaching, assessment, and professional development.
- Seek professional development related to new knowledge and skills that will improve science and mathematics programs in Chuuk.

FSM ~ Kosrae (Figure 9)

- Provide all teachers with the opportunity to improve their teaching skills through professional-development programs such as *Effective Classroom Assessment* and *Dimensions of Learning*.
- Improve the content knowledge of mathematics and science teachers, and expand their understanding of teaching, learning, and assessment as described in *Pacific Standards for Excellence in Mathematics* (PREL, 1995).
- Build on this new understanding to develop culturally and contextually appropriate standards-based instruction and to revise and align the mathematics and science curricula accordingly.
- Revise and align the high school mathematics and science curriculum guides, and develop a standards-based framework.

FSM ~ Pohnpei (Figure 10)

- Observe and report the impact of mathematics and science reform efforts.
- Provide opportunities for professional development to teachers, parents, administrators, and other individuals who are willing to implement the standards.
- Revise and realign Pohnpei elementary and secondary mathematics curriculum to a standards-based program, and integrate cultural and local environmental connections whenever possible.
- Provide professional development to implement mathematics content standards.
- Implement the aligned science framework in collaboration with other curricular areas.
- Involve parents and community members in the process of learning about our Pacific standards and their cultural meanings.
- Collaborate with others within the department and in the community to strengthen the implementation stages for professional development, teaching, and content standards.

Figure 11: Focus of Activities Serving FSM ~ Yap

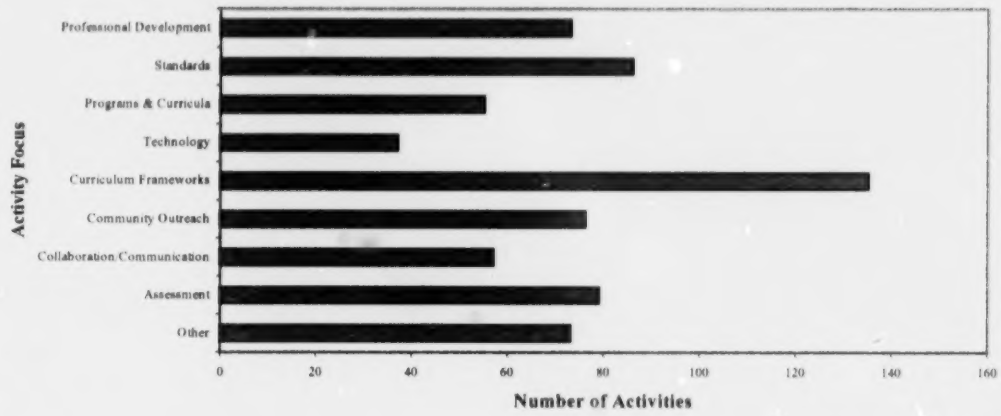


Figure 12: Focus of Activities Serving Guam

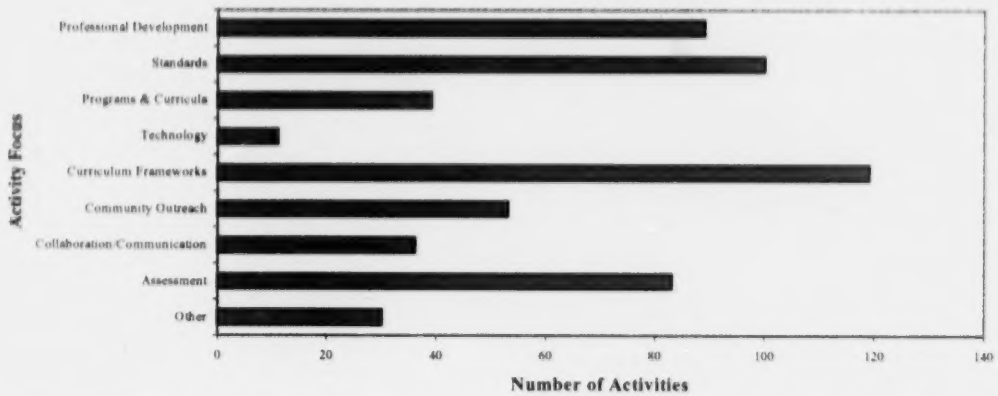
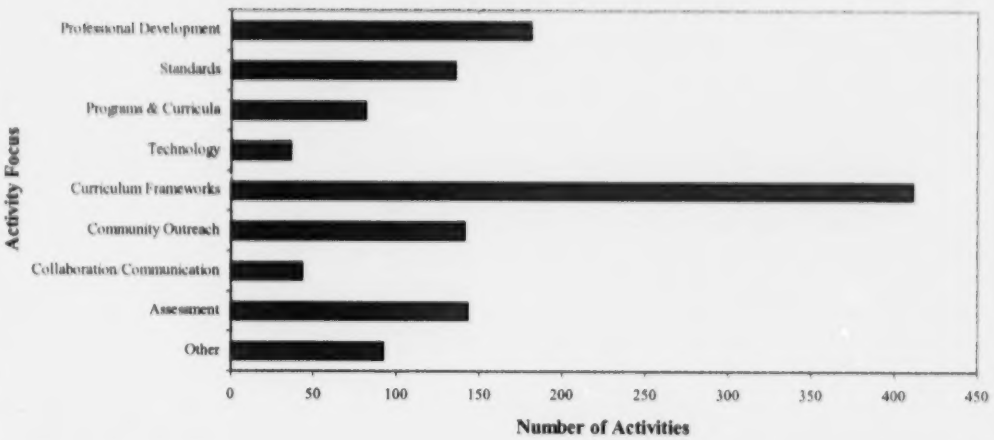


Figure 13: Focus of Activities Serving Hawaii



FSM ~ Yap (Figure 11)

- Develop a standards-based education system that is appropriate for Yap, with intensive and long-term professional-development opportunities for key central office staff, school administrators, and teachers to improve skills and knowledge in content and methodology.
- Provide all Yapese children with the opportunity to gain an understanding and appreciation of the importance of mathematics and science and their applications in daily life.
- Help the young people of Yap to develop a positive attitude toward mathematics and science beyond the classroom so that they may become wise decision makers and problem solvers who cope well with change in their surroundings.
- Develop thinking, reasoning, and decision-making skills in order to apply scientific knowledge and deal with environmental concerns on Yap.
- Develop culturally relevant, quality mathematics and science activities and materials in local languages.
- Provide students with the fundamental skills necessary to undertake further studies in mathematics and science.

Guam (Figure 12)

- Review and align Guam's mathematics and science content standards with regional and national standards.
- Develop and implement professional-development programs for the integration of mathematics, science, and vocational courses at the high school level.
- Develop, field-test, evaluate, and implement appropriate evaluation, monitoring, and assessment tools that support standards-based learning.
- Develop skills and capabilities to create standards-based classroom materials that incorporate Pacific/Guam contexts and cultures.
- Provide professional-development opportunities that enable mathematics and science teachers to carry out standards-based teaching and assessment.

Hawaii (Figure 13)

- Review and revise the state content and performance standards.
- Convene those most active in mathematics and science in-service work at the school-level to share ideas and more closely align efforts.
- Improve mathematics curricula by:
  - Continuing efforts at the secondary level to implement standards-based instructional programs including curriculum adaptations around voyaging and the development of professional development/impact videotapes
  - Broadening middle school pilot activities and beginning elementary school efforts
  - Supporting continued professional development and visits to implementation sites for exemplary programs.
- Improve science teaching and learning through continuation and scaling-up of critical-thinking and problem-solving activities with science teachers, and by providing school-based science

Figure 14: Focus of Activities Serving RMI

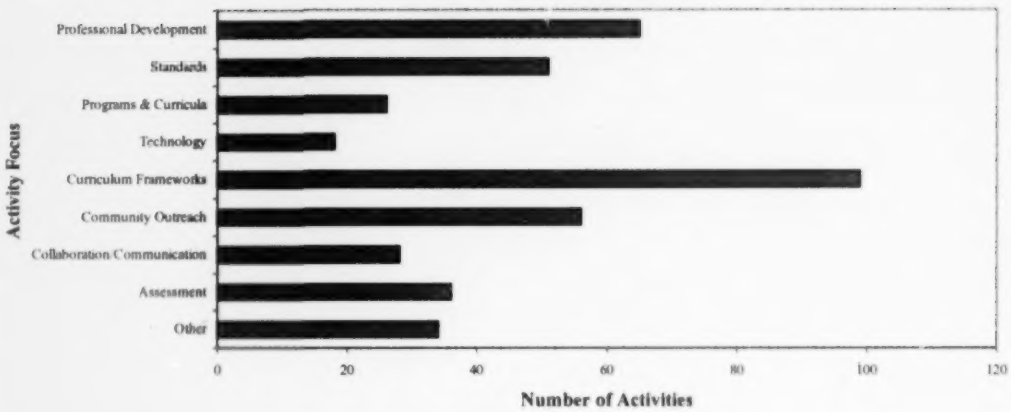
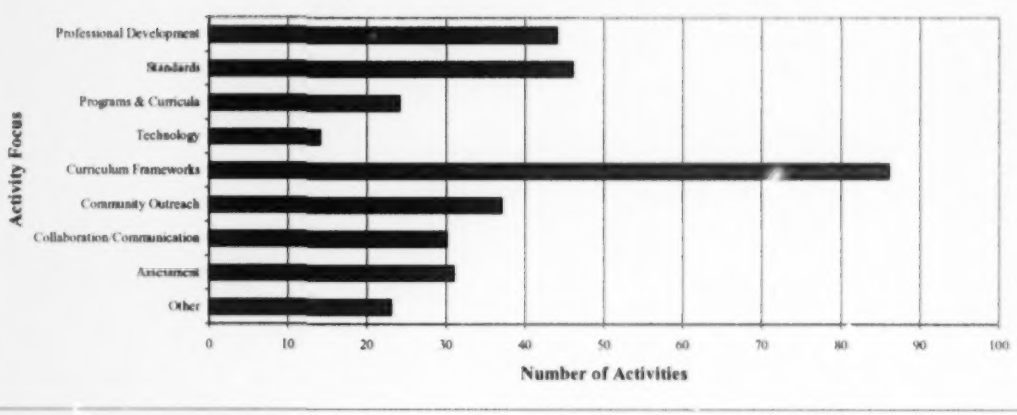


Figure 15: Focus of Activities Serving Palau



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professional development opportunities for elementary teachers.

- Improve science curricula programs at the high school level.

Republic of the Marshall Islands (Figure 14)

- Provide professional development in mathematics and science assessment processes.
- Develop pedagogical skills to enable standards-based teaching.
- Implement the Pacific Standards for Excellence and standards-based mathematics and science curricula in classrooms across the Republic.
- Develop resources to integrate educational technology that enhances mathematics and science instruction.
- Provide technical assistance to design and produce curriculum materials for grade 4 science and grade 8 mathematics. Other grades will be added in future years.
- Provide assistance for Internet and e-mail connectivity for mathematics and science specialists in order to enhance communication between the specialists and PREL.

Republic of Palau (Figure 15)

- Improve instructional leadership in mathematics and science at the school level and at the central office.
- Improve mathematics and science teaching and learning techniques, methods, and strategies.
- Implement the mathematics and science frameworks and the Pacific Standards for Excellence in Mathematics, Science, Teaching, Assessment, and Professional Development.
- Involve parents as active supporters of their children's education.
- Provide professional development for teachers in the areas of standards-based teaching, assessment, and multiple intelligence.
- Develop integrated content guidebooks for field-based studies within the Republic.

The Consortium's criteria and priorities and the entity goals and needs were matched to identify and deliver services through the Home Planning process and the Visions and Dreams Program.

The Home Planning Process

Having identified the priorities, each entity worked with the Consortium to develop an action plan around these high-priority needs, the Home Plan. The Home Planning process was an essential part of the Consortium's strategic planning and was intended to link the overall 5-year goals for the Region with locally determined goals, outcomes, projects, and activities. The development of plans was a data-driven decision made at the grass roots level and built upon a deep understanding of their respective education systems and the extensive data collection that takes place in the course of developing and implementing

Table 6: Visions and Dreams Program Criteria (10/01/1999)

The Visions and Dreams Program supports a wide variety of initiatives across the Pacific region which aim to improve the teaching, learning, and assessment of mathematics and/or science by:

- Implementing exemplary classroom mathematics and/or science practices - curriculum, instruction, and/or assessment.
- Increasing access of teachers to mathematics and/or science sustained professional development.
- School-based technical assistance for improving practices in mathematics and/or science.
- Increasing the use of technology to support mathematics and science instruction.
- Collaborative activities for improving mathematics and/or science teaching.
- Projects to support increased participation of students in mathematics and/or science.

Priority is given to efforts which:

- Include long-term professional development for teachers are given a priority.
- Include an entire school or groups of schools and/or projects which involve partnerships with colleges, parents and the community.
- Are likely to be able to serve as models for other schools in the region.

local education-improvement plans. The M/S Team played a critical role in both the design and implementation of these plans. The process engaged the team members and others from the education communities in each entity in the identification of direct services that met the established criteria and priorities of the Consortium and advanced local improvement initiatives.

The team members had lead roles in working with the Consortium to facilitate and support entity-focused initiatives resulting from the Home Planning process as well as to coordinate and monitor the school/community Visions and Dreams Program. The individual activities identified through the Home Planning process and supported by the Consortium contributed to the successful completion of one or more of the projects over the 5-year period. Each Home Plan was subject to periodic review and revision based on progress and changing and emerging needs. A series of educational planning meetings were conducted across the Region between October and December 1998. Meetings were held in each entity in order to provide a forum for reviewing educational plans and goals including an update of needs, determination of the current status of improvement efforts, and the identification of additional resources and programs which can be leveraged to further educational reform initiatives.

Visions and Dreams Program

The Vision and Dreams Program was conducted by the Consortium in conjunction with the various departments/ministries of education to provide support for teachers, schools, and communities to carry out projects for the improvement of mathematics and science education in a manner consistent with the Pacific standards and local initiatives. These projects enabled grass-roots efforts to bring about improved teaching and learning in mathematics and science. Schools, in partnership with their communities, designed and implemented activities that were designed to address their specific needs while moving their school community toward the entity goals identified in the applicable Home Plans. Projects varied in nature but focused on implementing exemplary mathematics and science instructional practices, expanding school-level access to training and technical assistance, broadening the effective use of technology to support instruction, increasing student participation in mathematics and science, and linking with parents and community to improve mathematics and science achievement. Public and private elementary and secondary teachers, schools, complexes, and districts throughout the Region actively participated in the program. Partnerships with informal educators, colleges and universities, and parent and community groups are part of a number of the projects. The guidelines for the Visions and Dreams Program appear in Table 6.

During the first half of the funding cycle, projects typically involved four to five teachers, at least 50 students, three to four community members, and at least one collaborating partner. Over the course of the 5 years, the Consortium worked with the M/S Team to increase the number of projects with school-wide focus. Most projects supported after the 1997-1998 were multiple-year efforts. Both of these adjustments

were driven by the desire to reach beyond individual classrooms and increase the likelihood of lasting impact.

Outcomes and Impact

The Pacific Consortium (PREL, CRDG, RAB, and the M/S Leadership Team), as a reflective organization, spent a considerable amount of time during Year 3 (October 1997 – September 1998) reviewing past work and revisiting the beliefs, priorities, and criteria underlying this work. The review led to the identification of a need to "proactively seek greater positive impact on classrooms" as the focus of Consortium work. The question "Is this likely to make a difference in teaching and learning?" became the Consortium's "core question" and the primary question asked during discussions to design activities.

The following design characteristics were identified as important in increasing the likelihood of a "yes" answer:

1. Professional development focused on sustained work at the school and classroom level;
2. Teams of participants from each site who can form professional communities and support each other's ongoing growth, from learners to reflectors, instructional developers, and researchers;
3. Local partners as integral parts of the Consortium's design, delivery, and follow-up efforts;
4. Potential to strengthen both content and pedagogical skills over time;
5. Extended follow-up supported by both the Consortium and the recipient school or agency;
6. Clear links to systemic reform efforts that support total school improvement;
7. Concise outcomes that lead to impact assessments as a way of informing further work within the project and designing future work.

These seven characteristics were integrated into the work of the Consortium over the remainder of the funding period. They led to more clearly defined outcomes for work, shifts in the planning and delivery of services, increased interaction with classroom teachers, and more and longer school-focused professional-development activities.

The primary purpose for establishing criteria and priorities, as well as the remainder of the planning process, was to support decision making by the Consortium over the course of the 5 years. Although there was a need to revisit and refine the decision-making process occasionally, the structure put in place fulfilled its purpose. As mentioned above, a review of the portfolio of work and its impact on teaching and learning during the 1997-1998 program year led to a realignment of the criteria which impacted all of the Consortium's work including dissemination and the Visions and Dreams Program. As the Interim Assessment found, the Consortium developed an overarching intellectual framework that guided its work. The central goals and a regionally shared vision of mathematics and science education improvement was

successfully tailored to fit the diverse cultures of the area and meet unique needs in a manner that would not have occurred without the Consortium's presence.

From the outset of the proposal-development process, it was agreed by Consortium staff and the M/S Team that the development and implementation of long-range plans would not only assist in guiding the Consortium but would also further coordination of DOE-initiated mathematics and science improvement efforts. Clients indicated that the process of developing a Home Plan prompted curriculum specialists and other educational leaders to work together and map out long-term efforts at the entity level. When interviewed, M/S Team members indicated that the planning process led to "work at home running more smoothly" and resulted in "increased collaboration and planning within the DOE." Clients reported that "better/more effective planning enabled [them] to work more closely with other agencies and organizations" in their entities.

Efforts supported through the Visions and Dreams Program will be discussed in greater detail in Sections VI and VII, however, it should be mentioned at this point that feedback from clients and an evaluation of a sampling of activities indicate the program was a successful school-based complement to the entity-focused activities identified in Home Plans. The program provided supplemental support to teachers, schools, and communities for a wide variety of local initiatives to improve mathematics and science. These ranged from sponsoring professional-development conferences to involving community elders in the classroom. The program assisted in the development of contextually appropriate materials and provided initial support for activities to increase student involvement in mathematics and science. Initially created as a series of numerous teacher-classroom-focused short-term efforts, Visions and Dreams was restructured in 1997 to a multiple-year school-wide focus. This change made the program more supportive of the standards-implementation efforts that were emerging across the Region.

with opportunities that:

- included experiencing good teaching which modeled effective standards-based instruction.
- further developed participant understanding of mathematics and science, emphasizing challenging, standards-based content.
- increased understanding of students as learners and addressed the need for a high-quality education for all children.
- built their pedagogical understanding including the knowledge and skills needed to create rich learning environments.
- developed participants as reflective practitioners.
- fostered the establishment of learning communities and prepared and supported local educators in leadership roles.
- provided access to long-term, coherent, professional development focused on the shared vision of mathematical and scientific literacy for all Pacific children.

Because of its importance in any improvement effort, and especially because of the Pacific Consortium's commitment to strengthening local and regional capacity, professional development was the focus in over 60% of all Consortium activities and more than 75% of its service activities. These activities averaged 18 hours in length and focused on numerous aspects of mathematics and science improvement (Figure 16). They utilized a variety of models and were designed, based upon research and exemplary materials, to engage local educators in design, delivery, and follow-up. These included the development of coaches, entity-wide summer institutes, school-based training addressing specific needs, convening informal seminars to stimulate dialogue among teachers, on-site technical assistance and follow-up through teleconferencing and attendance at national and regional mathematics and science conferences. As with other parts of the Consortium's work, professional-development activities became more focused on teaching and learning at the school and classroom level over the course of the funding period. Strengthening the mathematics and science content knowledge of the Region's educators is recognized as a very high priority. The Consortium has supported activities to meet this need both directly, through content-focused courses, and indirectly, through offerings which develop an increased understanding of content as part of activities focused on teaching.

Professional development was conducted via face-to-face interactions through most of the funding period. This model has been effective, but follow-up support has been difficult to arrange and expensive to provide. Although almost all initial professional development continued to be delivered in face-to face sessions, advances in the technological infrastructure allowed tools such as teleconferencing, videoconferencing, and Internet-based discussion groups to be utilized for follow-up in some parts of the Region beginning in early 1999. The capacity of M/S Team members, trained coaches, and others

developed to the extent that a significant amount of professional development and a great deal of follow-up can now be provided utilizing "local" expertise.

Strengthening Leadership

Pacific Mathematics and Science Leadership Team

Enhancing understanding leadership skills was an important component of the work of the M/S Team throughout the funding period. Each of the semi-annual team meetings featured extensive professional-development components. This began with the team's first meeting in November 1995. This meeting provided the team with its first opportunity to carry out an in-depth study of the three documents which make up the Pacific Standards for Excellence series, which was to form the foundation of the Consortium's work. With a goal of bringing the standards to life in classrooms across the Region, the team studied the documents and considered issues related to implementation. Issues considered included answers to questions such as:

- "What is the basic message of the *Standards for Excellence*?"
- "What are the implications of the standards for students, teachers, administrators, schools, communities, and education systems?"
- "What type of support is needed from whom if the vision of all Pacific children being scientifically and mathematically literate is to come to life in the Pacific Region?"

As a result of this experience, team members acquired a deeper understanding of the *Standards for Excellence* and their implications. It was also an opportunity to discuss hurdles which might be encountered, develop a variety of possible solutions, and plan initial "next steps" with partners at home. M/S Team members worked as a regional body to develop templates for presentations to a variety of audiences to increase understanding of the purpose and implications of standards among educators and in the community as a whole. They worked in collaborative teams to develop presentations for government and business leaders, education leaders, parent and teacher associations, parents of children with special needs, teachers in general, and school-based reform groups. These materials, in English and other languages, were used by the team especially during the first half of the funding cycle.

As a result of this experience and their initial standards implementation work with educators at home, the team identified the following professional-development priorities for themselves between Spring 1997 and Fall 2000. They believed that their effectiveness as leaders of improvement would be increased if they strengthened their skills in and understanding of:

- aligning curriculum, classroom practice, and assessment to regional and local standards.
- assessment and monitoring strategies, including tools to recognize and honor diversity among learners.
- the development of leaders so that they can effectively build coaching and leadership

teams at the entity and school level.

- curriculum-development processes that proceed from the analysis of instructional materials and standards to the design of instructional tasks.
- computer and telecommunications technology to support their own work and to improve teaching and learning at the classroom level.

Team meetings for the remainder of the funding period focused on the professional development of the M/S Team. Beginning with a consideration of "standards in action," professional-development topics included standards-based teaching and learning, designing and conducting effective professional development, coaching and mentoring for change, collecting and utilizing data for decision making, and fostering change at the school level. Each of the institutes was designed around one or more areas of mathematics and science content, which team members found to be problematic for educators in their respective entities.

As a result of these meetings, most team members participated in more than 250 hours of professional development, which impacted their role as educational leaders. In addition, approximately half of the team received Consortium support to participate in professional-development events in Hawaii and the U.S. mainland.

In 1995, only three of the M/S Team members had e-mail and access to the Internet. Over the course of the project, the Consortium provided the remainder of the team with e-mail accounts. They were also provided with professional development in both the educational applications of technology and electronic communication, and several listservs and discussion groups were established. The resulting increase in communication enhanced the work of the Consortium and provided the M/S Team members with greatly expanded access to resources.

Pacific Educators in Residence

The Consortium continued to support the development of regional leadership through the Pacific Educator in Residence (PEIR) Program. This program provided educators in the Region with the opportunity to spend approximately a year at PREL, learning more about the Consortium, assisting in providing services, and furthering either personal professional development or projects for the department of education that employs them. Three M/S Team members and an outer-island area supervisor served as PEIRs over the 5-year period. Sponsoring PEIRs represented a significant resource commitment on the part of the educator, the DOE, and the Consortium, but the intensive nature of the experience yielded a high rate of return. Each of the PEIRs indicated that they were "returning home" better prepared to

provide leadership for mathematics and science improvement, and with one or more substantive products to support their work.

Local Educators as Leaders

The Consortium provided professional development and support for local and regional educators who were assuming a greater role in the professional development of their fellow Pacific Islanders. The Consortium supported: Questioning and Understanding for Learning and Thinking (QUILT) trainers in Kosrae by providing training materials; Science Fair Training in the Marshall Islands provided by American Samoa's science specialist on her way to the Pohnpei leadership team meeting; and the work of the assessment trainers and M/S Team members in each of their home entities. These activities demonstrated that local and regional capacity and confidence was enhanced through the work of the Consortium.

The Pacific Consortium supported sustained classroom assessment initiatives in Hawaii, RMI, Yap, Pohnpei, and American Samoa. This model, which utilized *A Toolkit for Professional Developers: Alternative Assessment* as its base, developed cadres of local assessment coaches who were trained to work with educators at home and across the Region. The Yap project began in 1994 and matured to the point at which more than 90% of the state's teachers received some level of training. Yap's Classroom Learning Assessment Strategies for Success (CLASS) effort served as a model for the RMI project. In RMI, the Consortium supported the participation of a number of trainers to ensure that all atolls were represented, and training at the individual-school level would conform to national curriculum-implementation efforts. In addition to their work locally, the facilitators assisted with three sub-regional assessment institutes. These cadres of coaches worked with educators in their respective entities to develop and validate tasks and scoring rubrics within their specific cultural and environmental contexts. Coaches from Hawaii, Yap, and Pohnpei have made presentations and conducted pre-conference institutes at the annual Pacific Educational Conferences.

In the case of Hawaii, the assessment effort developed into the Hawaii Standards-Based Classroom Assessment Project which began in May 1998 as an effort to improve classroom assessment in all content areas. PREL staff who were involved in the development of the Toolkit and attended the February 1998 national training, facilitated a training of trainers for interested Hawaii educators. The initial 3-day training served 40 educators from across the state. The educators ranged from state and district office specialists to teachers and principals. After the training, these assessment coaches worked closely with classroom teachers in their respective schools or districts to address the need for high quality standards-based classroom assessment.

As a result of the first workshop and a follow-up in August, teams of teachers and central office

specialists sought PREL's assistance as they began to develop standards-based units. This was the impetus for the development of a teacher-friendly guide to developing instructional units based on local standards with an emphasis on the use of multiple authentic assessments. With the development of the guide came an increase in requests to apply the principles of high-quality assessment to both large-scale and classroom assessments. This work has grown to include a variety of ways of collecting and analyzing data as well as ways of communicating and reporting student learnings. As a result, a Hawaii Assessment "Hui" (focus group) was formed in 1999. The work continues through the Pacific Assessment and Accountability Center at PREL working with the Hawaii Department of Education's field-based assessment specialists.

Recognizing that improvements in the teaching and learning of mathematics in grades 4–8 was a high priority, PREL successfully sought funding from the National Science Foundation (NSF) for Project DELTA as a local systemic initiative in mathematics. NSF funds, augmented by Consortium support, focused on building teams to deliver effective, research-based in-service experiences to mathematics teachers in grades 4–8. The project supports a strong cadre of professional developers who strive to strengthen mathematics education in the U.S.-affiliated Pacific entities. Each entity's cadre consists of a mathematics curriculum specialist, at least one exemplary teacher selected by the DOE, and a mathematician and a mathematics educator representing the entity's institute of higher education. The cadre members are responsible for designing and implementing professional-development experiences incorporating content knowledge, pedagogy, effective evaluation and assessment strategies, and adaptive strategies for localizing instructional materials. This effort has led to a dramatic increase in locally available professional development for teachers of mathematics and strengthened collaboration between DOE and IHE mathematics educators.

The development of the CNMI Commonwealth Science Task Force provides a more entity-based example of Consortium support for emerging local leadership. Between 1997 and 2000, the CNMI Public School System and the Consortium collaborated to support the work of a group of teachers, administrators, and curriculum specialists as they worked to define important science in CNMI and design and implement strategies to move classroom experiences closer to that vision. The Task Force's work over the 3½ years led to changes in teaching in many of the entity's classrooms. Similar but less intensive efforts were undertaken with groups in Kosrae and Pohnpei.

Regional Initiatives

The Consortium employed a variety of strategies to support Region-wide professional development. In general, these all involved a "summer experience" with follow-up during the school year.

CRDG and the Consortium worked together over the course of the project to provide in-service

teachers with opportunities to experience standards-based curricula and instruction. The organizations co-sponsored annual summer institutes built around CRDG's exemplary mathematics and science programs. These programs, recognized as outstanding, are standards-based, appropriate for the Pacific, and widely used in Hawaii, the Consortium's most populated constituency. Institutes offered included *Standards-based Elementary Science*, *Standards-based Middle-School Science*, *Marine Education*, *The Teaching and Learning of Algebra*, *Teaching and Learning in Geometry Classrooms*, and *Teaching and Learning in Middle-School Mathematics*. These institutes were attended by over 1,000 educators from Hawaii and other parts of the Region between 1995 and 2000. Many of the participants went on to utilize the *Developmental Approaches to Science, Health and Technology* (DASH), *Foundational Approaches to Science Teaching* (FAST), *Marine Science Studies* (MSS), and *Algebra: A Process Approach* curricula around which the institutes were built. CRDG and the Consortium provided follow-up support in person, electronically, through videotape, and in print.

The Pathfinder Institutes described earlier in Section IV represented another strategy the Consortium utilized to act regionally to meet local priorities. The institutes were a collaborative effort by the Consortium, the Pacific Island Network, and a number of other agencies to conduct a series of four two-week workshops around the Region utilizing the marine environment to focus on standards-based teaching and learning. In addition to the knowledge and skills gained by participants, the Pathfinder Institutes led to a number of school-based implementation efforts supported through the Visions and Dreams program and the publication of the *Pathfinder Teaching and Learning Units*, a compilation of activities developed by institute participants.

The Pacific Algebra Network (PAN) project began in 1999 as a joint endeavor of CRDG, PRELSTAR, and the Consortium. The objective was to create a distributed learning community to help teachers and students throughout the Pacific Region develop problem-solving processes as they learn algebra. The project, a combined professional-development and curriculum-implementation effort, provided in-service summer institutes, continued Internet-based professional development, and provided multimedia-based support materials.

The institute was designed to demonstrate how mathematics standards and a problem-solving approach can be implemented in the teaching and learning of algebra. It focused on 4 processes: exposing learners to problem-solving on a daily basis, strengthening reasoning, encouraging communication, and creating connections with prior math knowledge.

To ensure success in teaching *Algebra 1: A Process Approach* at the middle- or high-school level, the 50 teachers who participated in PAN received in-depth professional development and on-going support over the course of a year via the Internet (e-mail and World Wide Web), as well as professional-development modules disseminated via videotape.

In addition to documented changes in teaching and measurable increases in student understanding of algebra, the PAN Project has resulted in a two-part CD-ROM. The CD-ROM includes videoclips illustrating standards-based teaching of algebra, assessment tasks, and student "lab activities." These materials will available for dissemination in mid-2001.

The Consortium supported numerous other regional professional-development events, either in conjunction with the Pacific Education Conference or as "stand alones" during the funding period. This included workshops such as the "Integration of Multiple Intelligences and Learning Styles into Program Design," "Collecting and Analyzing Data for School-Level Decision-Making," "Classroom Assessment in the Pacific," and "The Future of Educational Technology in the Pacific Region." The Pacific Region is characterized by a diversity of cultures, languages, and contexts. This diversity is an important consideration in developing curricula, assessments, and instructional practices that equitably meet the needs of a wide variety of students. The Consortium supported a 5-day regional conference entitled *Honoring Multiple Intelligences in Curriculum, Instruction, and Assessment* in September 1996 that engaged educators in a discussion of these issues. Attended largely by curriculum designers and professional developers from SEAs and LEAs across the Region, the institute focused on curriculum-planning processes and teaching strategies to meet the needs of the variety of students in the Region's classrooms. The institute was replicated by DOEs in Hawai'i, Chuuk, Palau, and CNMI as a component of their standards-implementation efforts.

These and other events were held in response to clearly identified needs present in multiple parts of the Region. As the project period progressed and each of the entities developed more clearly defined mathematics and science improvement initiatives, regional activities were appropriately supplanted by entity-based support.

Entity-Based Initiatives

The Consortium supported a wide variety of professional-development activities in each of the entities of the Region. These activities were identified as a result of the Home Planning process described in Section V. Two trends occurred over the course of the 5-year period. First, as entity standards and frameworks were developed across the Region, the professional-development activities became increasingly focused and more sustained. Second, as local educators increased their capacity, they delivered a larger percentage of the Consortium-supported activities. Because the Consortium approached all of its work from an integrated and collaborative perspective, it is often difficult to differentiate between efforts focused on professional development and those focused on instructional programs, so rarely did one occur without the other.

Summer institutes and courses made up a large segment of the Consortium's professional-

development portfolio. Institutes occurred annually in all entities of the Region. These institutes were especially important in entities like Yap, Chuuk, and RMI, where the summer break was the only time when outer-island teachers came together.

Strengthening the mathematics and science-content knowledge of the Region's educators is recognized as a very high priority. The Consortium supported activities to meet this need both directly, through content-focused courses, and indirectly, through offerings which developed an increased understanding of content as part of activities focused on teaching methods. The Consortium collaborated with IHEs in American Samoa, Guam, Palau, RMI, and Kosrae to offer content courses for in-service teachers. Other offerings were designed to increase educators' content knowledge and pedagogical understanding. The Consortium, in partnership with CRDG, offered an annual series of standards-based professional-development institutes at the University of Hawaii (UH). These institutes were open to, and often attended by, mathematics and science educators from across the Region. As a result of leadership-development activities such as the PEIR program and the participation of promising teacher-leaders in the institutes at UH, similar summer institutes were offered in RMI, Chuuk, Yap, Kosrae, and CNMI.

The Chuuk Science Education Improvement Initiative is typical of these undertakings. Beginning in 1995 as an effort to support the development of teacher/facilitators for the FSM/Australia Science Education (FASE) Project, the initiative grew into an annual science institute. During the early years the facilitation and presentation of the institute was carried out by staff sent from Hawaii. By 1999, however, the Institute was conducted by Chuukese facilitators who had been mentored into these leadership roles. This work, like the Kosrae Mathematics and Science Improvement Project, incorporated the finalization of frameworks and teacher professional development in order to prepare teachers for the transition to standards-based instruction.

The Consortium also supported a number of targeted, often school-based, professional-development initiatives in each entity. Examples include projects in American Samoa, where the Consortium worked to improve science and mathematics education by targeting middle-school teachers. Upper-elementary science teachers participated in a program that utilized current curricula materials in a "standards-based way." This group also developed skills to enable them to become lead science teachers at their respective school campuses. Upper-elementary mathematics teachers were targeted for extensive summer algebra programs with school-based follow-up during the academic year. The American Samoa *Algebra for All* effort increased teachers' understanding both: algebra and of ways of teaching algebra so that it can be taught effectively at the elementary level, enabling more students to take higher mathematics courses in secondary school.

The Radford Complex *Algebra Literacy for Everyone* project in Hawaii had a similar goal. Begun in 1994, the project's purpose was to prepare every Bradford Complex student to meet high school

graduation requirements, eligibility criteria for college admission, and challenging expectations for problem-solving in the 21st century. The Complex includes nine schools that are represented in the project by a cadre of teachers, administrators, and resource specialists. The project provided a K-12 scope and sequence for algebra across the Complex, set up processes for sharing algebra teaching experiences electronically, and provided professional development in both algebra instruction and the utilization of technology.

Project Al Maron at Ebeye Elementary School in the Marshall Islands represented a school-wide improvement effort involving partnerships with the school's governing body and a cross-section of PREL's programs. The comprehensive school-improvement program was aimed at 4 areas: 1) instruction, 2) facilities, 3) leadership, and 4) parents/community. Needs assessments were conducted and mathematics instruction was identified as one of the project's high priorities. As a result, the Consortium's work focused on technical assistance in mathematics as well as development of RMI's mathematics and science specialists to better enable them to work with the school on a long-term basis.

Initiatives funded through the Visions and Dreams program made a significant contribution to the Consortium's professional-development efforts. The Consortium supported over 50 projects during the 5 years. In some cases these projects provided direct professional development, but more often they were a vehicle for school communities to extend and implement understandings gained in other professional-development experiences as part of the mathematics- and science-improvement process. Although the projects were beneficial to all recipients, they were particularly important for remote and outer island communities that otherwise would have been without support during the school year. The projects were as diverse as the communities they served.

In American Samoa, Visions and Dreams supported: after-school tutoring programs to assist students in meeting standards; the implementation of instructional practices to foster problem-solving; science experiences which brought the school and community together; the development of instructional materials to support effective utilization of the marine environment as a teaching tool; and, the enhancement of mathematics and science instruction through the effective utilization of educational technology.

In CNMI, projects included school-based efforts to align teaching with standards and the incorporation of the local environment and culture into the curriculum, but the major emphasis was a multi-year series of institutes on each of the commonwealth's three islands. These institutes were designed and conducted by local education leaders including teachers. Guam used Visions and Dreams support for very similar purposes through multiple-school professional-development activities.

Chuuk's Visions and Dreams were entirely focused on furthering mathematics and science improvement in outer-island schools. All of the projects focused on connecting the school experience with the surrounding environment and the community. The Lekinioch Atoll project was a joint effort

involving two elementary schools, the communities they serve, and the DOE in a school-reform process focused on mathematics and science and based on the School Community-Based Management (SCBM) process. Other projects brought together students and community members in a variety of ways to enhance mathematics and science experiences through the use of cultural knowledge, traditional technologies, and the local environment. Similar projects incorporating local context and environment as a means of both honoring culture and increasing student engagement in meaningful mathematics and science occurred in Yap and RMI particularly in outer-island schools. Efforts in RMI also included support for the implementation of the GLOBE program and increased professional development and support for outer-island schools during the school year.

In Hawaii, Visions and Dreams-supported initiatives took place between 1995 and 1997, after which time the program was subsumed as part of Title II activities. Between 1995 and 1997, the HIDOE and schools in Hawaii were largely focused on aligning the recently released HCPS with school curricula. Efforts supported through Visions and Dreams furthered those efforts at sites across the state. This is explained in greater detail in Section VII.

The Visions and Dreams program in Kosrae became a mechanism for school-based improvement and professional development through the building of teacher-leader cadres. School-based science teams from Lelu and Sansrik Elementary Schools and a multi-school mathematics team participated in a variety of summer institutes and returned home to lead mathematics- and science-improvement efforts.

Both Pohnpei and Kosrae utilized Visions and Dreams funds to support collaborative projects with informal environmental groups. These efforts leveraged resources from the DOE, other government agencies, nonprofit organizations, and the Consortium to link science education to the study of environmental issues. In Pohnpei the project focused on the impact of introduced methods of farming in the environment and led to a self-sustaining activity with students and community members marketing their produce. The Kosrae project had a broader focus which brought together educators, government and community leaders, non-profit organizations, and the Consortium to develop and implement an entity-wide environmental-education program. The Consortium and the DOE worked together to produce associated Kosraean language materials for use in the schools.

Outcomes and Impact

Clients considered the professional-development opportunities made available through the Consortium over the 5-year period relevant and useful—as contributing to the improvement of their practice and the performance of their students. Over 90% of the clients surveyed reported that the technical assistance and professional development provided by the Consortium was aligned with the national and/or entity standards. In addition, similar percentages reported that these services promoted

high-quality curricula and instructional practices which provided students with opportunities to attain challenging standards. The high level of client satisfaction is the result of both the Consortium's service quality-assurance process and the emphasis placed on Home Planning. Home Planning led to services that were well aligned with local priorities and that were coordinated with initiatives supported by the DOEs and others.

Clients who participated in these services stated that changes had resulted in their classrooms as a result of the professional development—89% reported improvements in their instruction, citing shifts in instructional strategies and classroom assessments as key changes. At-risk and underrepresented students make up a very large percentage of students in the Pacific Region, thus it was rewarding when 80% of respondents indicated an increased ability to meet the needs of these students. Over 80% reported that student engagement had increased and performance had been enhanced. Impact of this nature is probably largely the result of the Consortium's increased emphasis on sustained work that engaged participants in more hours of professional development spread over longer periods of time. Sustained activities 12 hours and longer grew from just over 20% to nearly 60% of the Consortium's technical assistance/professional development portfolio.

"Local" coaches, facilitators, and trainers were another key ingredient in the Consortium's success. Over the 5 years, the Consortium supported the development of approximately 100 professional-development leaders across the Region. These individuals had a rich understanding of the context in which improvement was undertaken that enabled them to make appropriate adaptations and connections. Approximately two-thirds of those trained went on to provide professional development to others. Post-workshop evaluations of a sampling of the presentations made by these individuals indicate that they were providing meaningful, high-quality services to others. The greatest challenge faced by these trainers was time. Almost all of the one-third that did not go on to provide training reported that time was the barrier. Since most parts of the DOEs in the Region do not have policies and procedures related to "release time," this will continue to be a challenge, particularly for school-based individuals.

The Visions and Dreams Program supported mathematics and science improvement across the Region. The program provided a means of enabling local educational communities, especially isolated schools, with a means of supporting the implementation of standards and frameworks. The results of this program are many and diverse; so only a representative sample are presented here.

Increased student interest in and engagement with mathematics and science was an important objective of the Consortium. As a result of Visions and Dreams efforts, science and mathematics fairs have become institutionalized in many of the entities, such as Palau, Pohnpei, and Kosrae. As clients indicated, "the Visions and Dreams program increased mathematics and science opportunities for students and [their] engagement has greatly improved." In addition to the work at the program sites, numerous

project-focused conference presentations were given, and a number of the projects were scaled-up and replicated at other sites.

Six of the schools which were supported in the Visions and Dreams Program participated in the Determining Study. Data were collected in 2000, and the reports completed in 2001. Teachers completed surveys, which included questions about their opinions of school-level support and their views on professional development. During interviews, teachers were asked to consider the changes in their school over the past five years. In one of the schools, teachers as a whole emphasized a shift from lecture format to student-centered teaching as the driving force behind changes in classroom operations, better student performance, improved student attitude, and increased student participation. The teachers also had high reports of professional-development workshops, indicating that they are very effective in exposing them to new ideas and methods. The teachers in another of the schools reported a high level of support from colleagues in trying out new ideas in teaching mathematics and science, and indicated that teachers in the school have a shared vision of effective mathematics and science instruction. They unanimously agreed that the importance the school places on mathematics and science encourages effective instruction.

When asked how students responded to changes in their mathematics and science programs, teachers in one of the schools indicated that students are learning to take better care of their environment/islands; students are more interested and say it is their favorite class; new methods and availability of materials make student learning easier; students appreciate what they are learning; and by not sticking to the book and doing individualized planning and sequencing, students seem to learn better. In two of the schools, interviewed teachers discussed entity-level standards and frameworks. In one school, they specifically referred to the helpfulness of anchoring their lessons to standards and benchmarks. They reported that they are deliberately adopting a student-based approach, involving more students in activity-based learning, accommodating different learning styles and abilities, and encouraging exploration of alternative solutions. In the other school, 71% of the surveyed teachers indicated that the entity curriculum frameworks encourage effective instruction. The same percentage reported having completed a course/institute/workshop in mathematics or science teaching within the last 5 years, and the same number in mathematics or science content. In surveys, teachers who attended workshops, citing PREL, DASH, FAST, and Pathfinder in Hawaii, reported on the positive impact on their ability to teach.

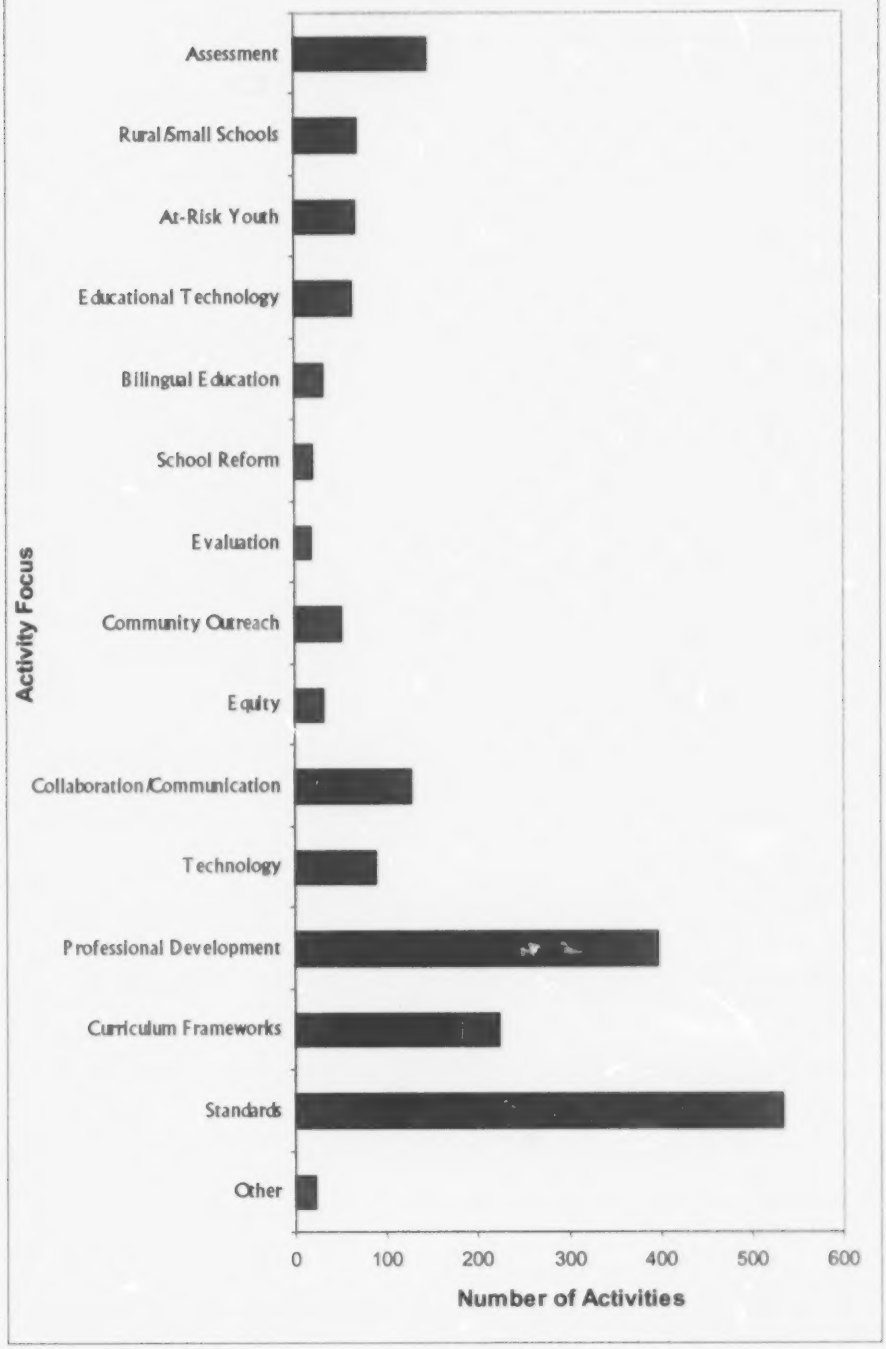
A number of Vision and Dreams initiatives involved students and community members working together on sustainable, environmentally sound agriculture projects. Projects in American Samoa, Pohnpei, and Yap are now self-sustaining and income generated through the sale of produce supports the acquisition of mathematics and science instructional materials for use in the classroom.

Micronesian Seminar recently released a study of successful schools across the Pacific states in free association with the U.S. The study, *Islands of Excellence*, used tools such as the results of high -school

entrance tests to identify Islands of Excellence. The selected schools were presented as a sample of some of the very best, not just as measured in their test scores, but in their reputation for good instruction and creative programs: "If education in Micronesia is sometimes presented as a 'sea of mediocrity,' these schools stand as Islands of Excellence in that." Although the Consortium does not claim that its work was solely or evenly largely responsible, it was satisfying to note that 7 of the 12 recognized schools had been participants in the Visions and Dreams Program.

In a similar vein, the Consortium's school-based effort at Mokapu Elementary School in Hawaii was selected as the exemplar of high-quality, intensive technical assistance in *An Evaluation of Implementation and Impact of Federal Education Legislation Enacted in 1994* submitted to Congress in April 1999 by the Planning and Evaluation Service of the U.S. Department of Education Office.

Figure 17. Instructional Program Activities by Focus



VII. Mathematics and Science Instructional Programs

Identify, adapt, field test, evaluate, and implement standards-based promising mathematics and science instructional programs for Pacific environments and cultures from preschool through grade 12 so that by the year 2000 there will be:

- Effective curriculum, instruction, assessment, and reporting (CIAR) by proactive practitioners taking place in classrooms throughout the Region.
- An expanded capacity to develop, adapt, and customize CIAR to reflect the environment, culture, and language.
- An ongoing process for continuing dialogue, development, and refinement of CIAR in place.

Instructional Programs (Activities as proposed)

4.1 Assist entities and schools in modifying their existing curricula to meet challenging Pacific standards.
4.2 Identify, adapt, field test, and evaluate instructional programs that promote standards-based teaching and learning of mathematics and science.
4.3 Involve families and communities in determining environmentally and culturally effective mathematics and science activities.
4.4 Disseminate and implement instructional programs that work.

Approved Application References: Part 3, pages 7-8, and 19-20.

The Consortium's portfolio contained a very diverse set of activities focused on ensuring that schools in the Region had access to standards-based curricula materials that support culturally and contextually appropriate standards-based mathematics and science teaching, learning, and assessment, and are likely to engage students. The Consortium responded to these needs by working with educators in each entity to help them move towards adopting standards-based curriculum, instruction, assessment, and reporting in classrooms. Support ranged from technical assistance for completing framework development, aligning curriculum with new frameworks and standards, and developing and enhancing curricula to meet challenging standards (Figure 17). These efforts, and the professional development associated with them, constituted two-thirds of Consortium services. CRDG, and the exemplary materials they developed, were invaluable in this area of the Consortium's work.

The completion of the Pacific Standards for Excellence series in September 1995 provided regional definitions for mathematics and science curriculum, instruction, and assessment. The Consortium then undertook a series of substantial technical-assistance projects aimed at assisting each entity as it developed and/or revised frameworks and curriculum guides to reflect challenging mathematics and science standards, current research related to effective teaching and student learning, unique

circumstances and needs. As a result of Consortium support, all of the entities in the Region developed mathematics and science frameworks and, in most cases, conducted an analysis of existing instructional programs to determine the nature and extent of correlation with the revised frameworks. In many places these documents were disseminated to teachers and are now in the process of revision and clarification based upon feedback from the field.

Having defined important mathematics and science, educators across the Region began the process of identifying instructional programs and practices supportive of students achieving these high expectations. The Consortium worked closely with each entity to further the identification and implementation of classroom practices aligned with the standards and to support the identification/implementation/ adaptation of standards-based instructional materials. Much of the work in this arena was integrated as part of the professional-development activities described in the previous section of this report. The activities described below reflect very diverse efforts designed to accommodate the educational and cultural contexts across the Region.

The various parts of the Region moved in very different directions in response to the need for instructional programs that would provide students with an opportunity to meet the expectations expressed in the standards and frameworks which had been developed. Hawaii, Guam, CNMI, and American Samoa generally opted to purchase programs and make adaptations while the Freely-Associated States (Chuuk, Kosrae, Pohnpei, Palau, RMI, and Yap) made the decision to explore the development of local materials that reflected entity cultures and values and were sustainable. Many of the Freely-Associated States have since decided to adopt mathematics programs from "Mainland" publishers but continue to develop local science materials. The Consortium has supported all of these efforts to the extent possible.

Assistance to Guam, American Samoa, and CNMI consisted largely of providing professional development to enable teachers to use existing instructional materials more effectively.

CNMI made a decision to adopt Mathland as the basis for the grade 1–6 instructional program and the University of Chicago School Mathematics Project materials in grades 7–12. After adopting these materials, CNMI found that they are not appropriate for all students in their schools. The Consortium provided support for the CNMI Mathematics Curriculum Improvement Project by designing adaptations to the professional-development experiences including the use of demonstration teaching and coaching. As a result of the positive impact on teachers in the pilot school, the effort was scaled-up to include other schools and classrooms. The Consortium also assisted the mathematics specialist in locating instructional techniques that bridge difficulties in reading. The instructional techniques link oral and written language with group-learning strategies.

In American Samoa, the Consortium supported professional development to assist teachers to more

effectively utilize existing materials. The Consortium also supported efforts to increase the teaching of algebra in grades 7 and 8 mathematics and to build a marine-education component for the science curriculum.

The Consortium worked with the American Samoa DOE to improve mathematics education by targeting middle-school teachers. In 1997 and 1998, upper-elementary mathematics teachers participated in extensive summer algebra programs with school-based follow-up during the academic year. The American Samoa *Algebra for All* effort increased teachers' understanding of both algebra and ways of teaching algebra so that algebra could be taught effectively at the elementary level, enabling more students to take higher mathematics courses in secondary school. This effort led to an increase in algebra achievement by 8th graders. The Pacific Algebra Network became the next step of this program when it began in 1999.

The American Samoa DOE Division of Curriculum and Instruction, in partnership with a number of elementary schools, used Visions and Dreams to support the Marine Education Enhancement Program. This program involved upper elementary students in standards-based science experiences built around the marine environment. Data collected were made available via a wide-area network so that results could be shared and discussed across the island. The project also led to the development of a *Field Guide of Shallow-Water Marine Invertebrates of American Samoa* as an instructional supplement for grades 7 and 8. *The Coral Reef Alphabet Book for American Samoa* was developed as an instructional supplement to build awareness of the marine environment among lower elementary students.

Unlike the rest of the Region, much of the work in Hawaii was focused on the identification, piloting, and implementation of existing standards-based curricula. In science this work was built around CRDG's FAST and DASH programs. In mathematics the NSF-supported programs were the focus. Hawaii DOE allows textbook decisions to be made at the school level so it follows that the Consortium's work was generated at this level.

During the early part of the funding cycle many of these efforts were Visions and Dreams supported initiatives to assist teachers, schools, and complexes through the standards-alignment process. The Challenging Mathematics Project with South Hilo Complex and the Algebra Literacy for All Project at Radford High School are examples of complex-level initiatives. School and grade-level examples of similar initiatives include the Number Sense Project at Mauka Lani Elementary School, which focused on developing number sense in the lower elementary grades, the Challenging Mathematics Project, which focused on instructional programs to further standards-based instruction for gifted/talented students, and Hilo High School's Science Curriculum Project, which looked at the alignment of the current course offerings and the Hawaii Content and Performance Standards (HCPS) as well as exploring alternative ways of offering science in the high school.

The activities identified through the Hawaii Home Plan and Visions and Dreams both supported the piloting and early implementation of NSF-supported mathematics programs. The Interactive Mathematics Program was chosen as the state's preferred standards-based secondary mathematics instructional program. The Consortium supported piloting and data collection at a number of sites, the development of two Hawaii-focused awareness and professional-development videos, and the development of a teachers' guide for an Interactive Mathematics Program unit adapted to focus on Polynesian voyaging. The Consortium continued to support schools through the process throughout the funding period. In instances where schools opted not to change textbooks, the Consortium provided professional development and technical assistance to assist educators in the use of existing materials to enable students to meet HCPS.

The Mokapu Elementary School Improvement Model in Science in Kaneohe, Hawaii, was a unique partnership between the school, CRDG, and the Consortium that focused on developing a whole-school, comprehensive approach to instructional improvement in science education. Based on DASH, the Mokapu project provided the school's science teachers with an opportunity to move through the change process as a professional community and to conduct action research concurrently. The project has included grade-level and school-wide science-curriculum articulation, the integration of science with other subject areas, meeting state and national science standards, and designing and implementing appropriate assessments. All teachers have participated in extensive summer professional development and are supported by grade-level lead teachers/mentors and cognitive coaching during the year. The project has shown very encouraging results to date and it is expected that scaling-up will occur when the Mokapu work is completed in the fall of 2001.

The following snapshots from Pohnpei, Yap, RMI, and Kosrae are reflective of the work undertaken by the Consortium in the Freely-Associated States.

The Pohnpei Curriculum, Instruction, Assessment, and Reporting (CIAR) Initiative began in 1996 with selected teachers and principals taking part in a series of professional-development sessions to train coaches. Initially focused on expanding the classroom-assessment knowledge and skills of master teachers and principals, the group acknowledged the essential connections among standards, curriculum, assessment, instruction, recording, and reporting. The coaching team responded by expanding its work to cover all six elements. The Consortium supported the professional development required for the group to successfully take on this expanded role. Members of the coaching cadre formed learning communities within their own schools and, in many cases, involved teachers from nearby schools. These learning communities were engaged in the developing, field-testing, and disseminating standards-based teaching units. A variety of Visions and Dreams initiatives supported the involvement of parents, traditional elders, and other community members in the unit-development process and in student and school "Celebrations of Learning." CIAR unit development continues in a more focused manner aligned with the recently

completed mathematics and science frameworks.

Kosrae implemented a process similar to that used in Pohnpei. Cadres were formed to develop supplemental and replacement activities to enhance existing instructional materials. The work of these cadres was supported by Visions and Dreams initiatives at two school sites. The science staff of one school and the lead mathematics teachers of both schools attended summer institutes in Hawaii. As a result of attendance at the institutes, these teachers were able to return to Kosrae and inform the design and development of the instructional program. In the case of the science group, the work they have carried out at their schools is being replicated in other schools. Kosrae DOE also decided to support improvement in the high school mathematics program, designating the entire mathematics department as participants in the Pacific Algebra Network. Lastly, the DOE, in an effort to meet its goal of strengthening environmental education in the science program, entered into a partnership with the RARE Center and the Consortium to develop educational materials for the schools and community. The Consortium assisted with the development of two environmentally focused booklets in Kosraean for use with students.

Yap approached instructional program issues in a very different way. The Yap Department of Education began an initiative to plan and develop culturally relevant curriculum materials in 1997. Yap was committed to providing its students with an opportunity to learn challenging content through materials related to the island context and, at the elementary levels, in the vernacular language. The curriculum improvement efforts that had already been underway were furthered by the 1996 Yap State Economic and Social Summit's recommendations to increase the development of materials that reflect contexts familiar to Yapese children in local languages . Yapese educators, Consortium staff based at the Yap service center, and CRDG staff worked together to redesign the science materials so that they were more inclusive and standards-based. Review of the newly revised materials and the initial implementation training took place early in the summer of 1997 and was followed by a series of summer workshops with teachers, curriculum specialists, and community members around the state, including some from isolated atolls accessible only by boat. These sessions resulted in the development of science curriculum materials in the state's four languages. A second series of summer institutes was held in July 1998.

During the summers of 1998 and 1999, teachers were brought together on the three development sites of Ulithi, Yap, and Woleai to develop instructional units in mathematics and science using the vernacular materials as supporting classroom materials. Teachers on the three sites developed a series of integrated instructional units which focused on mathematics and science. These instructional units are now being implemented in schools in grades 1 and 2. Additional vernacular materials for grades 3–6 were developed by teachers and disseminated for use in the 1999/2000 school year. The development of materials for grades 7 and 8 is currently underway. The teaching of mathematics and science through vernacular first-language materials is strengthening the connection of what is learned at school with the home context for

the children in Yap. The project continues with support being provided though local school communities and existing programs at the DOE. The funds provided through the Consortium allowed for the "jump start" of this initiative, enabling the convening of teacher groups, gathering of materials to prepare the books, and printing. This project has provided a greater awareness of the need for improved mathematics and science content learning as well as the importance of vernacular literacy in Yap State.

Mathematics and science improvement in the RMI was incorporated in a larger national curriculum effort supported by the Asian Development Bank. The Consortium provided technical assistance in the areas of mathematics, science, and assessment during the development process. Upon completion of the frameworks, the Consortium assisted mathematics and science specialists with the design and implementation of professional-development institutes for teachers. The Consortium also provided assistance in the revision and clarification of the frameworks. This work was based on feedback from the initial teacher institutes and was undertaken while the specialists were PEIRs at PREL. The Consortium continued to support implementation efforts by assisting with the adaptation and implementation of science experiences to augment the existing curriculum and technical assistance to further the successful implementation of the recently adopted "Mainland" mathematics program. The Consortium and CRDG are considering beginning the development of a DASH-based Pacific Science Series as a result of the success of the work in Yap and the RMI and similar requests from Kosrae and Pohnpei.

Product Development and Dissemination

Product Development

The development of products, in and of itself, was not a high priority for the Consortium. However, there were numerous products developed in conjunction with the Region's DOEs for use with specific audiences and entities during the 5-year period. An on-going assessment of the overall progress of mathematics and science reform led the Consortium to develop a number of products for wider dissemination.

The Pacific Standards for Excellence were completed by the publication of two policy briefs. The first, *Aligning Content, Program, and System Standards in Mathematics and Science Classrooms*, discussed program and system standards which can support improved teaching and learning in the classroom. The brief concludes with recommendations to administrators and policy makers interested in supporting standards-based improvement efforts. The second, *Systems and Policies That Support Standards-Based Instruction,* was a 16-page paper describing important characteristics that need to be in place in order for classroom educators to successfully transition to standards-based instruction and assessment. This piece incorporates current national research and experience in the Pacific. The entire Pacific Standards for Excellence series, including mathematics, science, teaching, assessment, and

professional-development standards, was made available on CD-ROM in early 1996.

The need to better understand the challenges of professional development in a Region as diverse as the Pacific and to share that knowledge with others led to the publication of *Teacher Diversity: Implications for Professional Development*. This publication is a synthesis of current research on the design and delivery of professional development in culturally diverse contexts. The synthesis was used to inform the work of the Consortium and was disseminated to the M/S Team, other service providers in the Region, and clients as part of Consortium efforts to improve the overall effectiveness of professional-development activities across the Region.

As standards-implementation efforts moved forward across the Region, there was a clear need for products that would help educators and community members to develop a clearer picture of what "standards look like." The Consortium published a short brochure entitled *What Does A Standards-Based Classroom Look, Sound and Feel Like?* that targeted classroom educators, as well as parents and community members, in the early stages of transition to standards-based instruction. The brochure was initially published in English but parts of it were translated to other languages of the Region for use in entity-based professional-development activities. PRELSTAR, CRDG, and the Consortium collaborated in the development of a one-hour video that focused on classrooms where inquiry-based science occurs. This recently completed video is designed for use in professional-development events or as a "stand-alone" tool for individual teachers. The same three groups worked together to design and implement the PAN project. PAN has resulted in an interactive set of two CD-ROMs that portray standard-based mathematics instruction in algebra classrooms.

The *Weaving Standards Into Instruction: A Teacher Friendly Guide* was co-developed with the PC and REL. This guide uses "teacher-friendly" language to describe a process for incorporating standards into instructional design and includes the development of appropriate classroom assessments to determine student progress. The *Pathfinder Teaching and Learning Units*, released in 2001, provides as examples marine-science units developed using this model.

Preparing schools and communities for the change that occurs during the standards implementation is an important step in the improvement process. The *Heart of PRESS* is a streamlined version of the *Pacific Region Effective and Successful Schools* developed by the Pacific REL a number of years ago. The Consortium, REL, and PC collaborated to make available this tool to assist schools with setting a vision and reforming practice. The process is viewed as particularly important for mathematics- and science-improvement efforts when school beliefs and processes are not supportive of standards-based reform.

As mentioned earlier in this report, the Consortium worked with the Eisenhower Network and others to develop a number of products with a national scope. These included *Blueprints, the Equity Resource*

Table 6: Dissemination Contacts by Entity

Entity	Year 1	Year 2	Year 3	Year 4	Year 5	Total
A Samoa	2,641	1,838	2,160	795	7,882	15,316
Chuuk	2,894	2,607	3,407	1,394	14,962	25,264
CNMI	1,511	1,505	1,352	484	9,218	14,070
Guam	3,895	2,877	5,272	1,987	11,082	25,113
Hawaii	28,227	22,102	33,375	13,957	72,561	170,222
Kosrae	544	376	299	98	8,639	9,956
RMI	2,184	2,152	2,506	1,080	8,606	16,528
Palau	1,207	1,150	1,232	483	5,223	9,295
Pohnpei	1,867	1,623	1,642	635	3,167	8,934
Yap	1,138	1,092	1,086	455	8,778	12,549
Other	1,190	1,804	628	161	10,026	13,809
Total	47,298	37,322	52,959	21,529	160,144	319,252

Figure 18: Dissemination by Content of Material

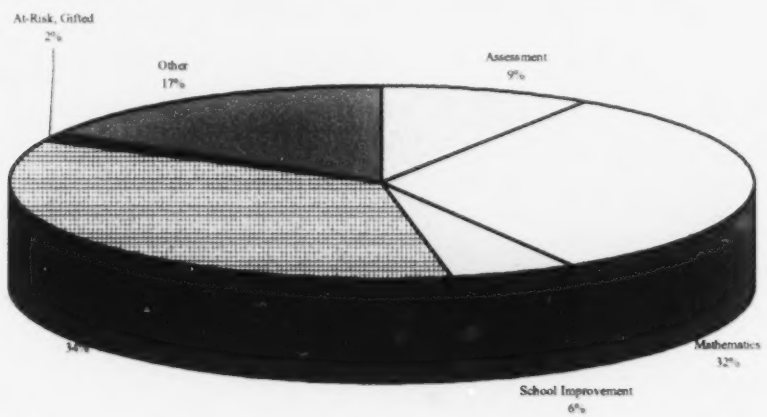
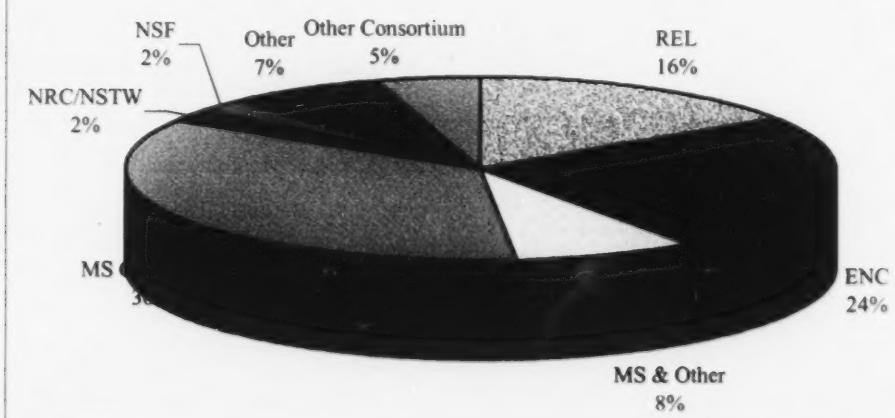


Figure 19: Dissemination by Source of Material



Guide, and the *1998 Assessment Toolkit*. These products made significant contributions to the work of the Consortium in the Pacific.

Dissemination

As part of its efforts to improve access to resources and facilitate understanding of standards-based mathematics and science teaching and learning, the Consortium disseminates a variety of products to its constituents. The Pacific Consortium has made a concerted effort to carry out more targeted dissemination and increase the likelihood that clients receiving products and information will find it both accessible and useful. This has included:

- Ensuring that all Consortium-developed products are available through the Pacific Consortium's website in a timely fashion;
- Improving mailing databases so that a higher percentage of the materials disseminated are sent to individuals rather than "positions";
- Providing recipients with an easy way of requesting additional materials of interest;
- Carrying out a higher percentage of the dissemination in conjunction with related professional development.

The Pacific Consortium carried out 454 dissemination activities over the 5-year period. Items came from a variety of sources and covered diverse topics within the mathematics- and science-education-improvement arena (Figures 18 and 19). During the current reporting year, 100,980 print items were disseminated (Table 7), equivalent to 50,590 annually.

The Consortium newsletter, *Voyages in Mathematics and Science*, was regularly sent to every school in the Region. The newsletter was disseminated via mass mailing as a means of informing the education community regarding mathematics and science improvements, of increasing awareness of the work of the Consortium, and of providing information concerning opportunities and resources. Multiple copies of the *Voyages* newsletter were sent to each school in the Region through DOE mailing systems. Individual educators were invited to request personal copies if they desired, and as a result of such requests, circulation of the newsletter increased by 3,000 in the last 24 months.

Materials produced by ENC were also broadly disseminated across the Region, making up approximately 25% of the Consortium's dissemination activities. These materials were disseminated in a focused manner with consideration for constituent needs regarding topic and content. As with *Voyages*, ENC mailings increased dramatically during the later years of the project.

Fully one-third of the Consortium's dissemination activities, excluding *Voyages*, were carried out in conjunction with technical assistance and professional-development activities training. The materials disseminated as part of sustained activities came from a variety of sources and covered diverse topics.

Approximately 45% were products of the Pacific Consortium, including those developed in partnership with other programs and organizations, and they were specifically designed to meet the needs of Pacific educators. The Eisenhower Network provided the Pacific Consortium with a means of accessing resources from other consortia. These resources made an important contribution to the Pacific Consortium's work and constituted approximately 10% of focused dissemination activities during the last 2 years of the project.

The electronic dissemination through mathematics and science pages on PREL's web site, http//www.prel.org, continues to serve as a means of disseminating information to clients with Internet access. The site recorded over 120,000 hits between March 1, 1999 and February 28, 2001. It served approximately 22 users a day who stayed at the site for an average of 28 minutes. Although the number of users visiting the site daily decreased, clients visiting the site spent more than three times as long. There was also a significant increase in the number of users from outside of the fifty states. International users, including those from the Region outside of Hawaii, now constitute nearly half of the visitors. Although electronic dissemination has many advantages, there are still large parts of the Region that do not have access to Internet and other means of dissemination remain important in the Pacific.

Outcomes and Impact

The Consortium's work in the area of instructional programs was that of an "enabler". The Consortium provided technical assistance and professional development that supported groups across the Region as they defined and developed tools to implement standards-based mathematics and science education. The M/S Team members rated the Consortium's assistance with instructional practices as its most significant technical assistance contribution. As one team member stated, "Without the Consortium we would not have had standards or any of the other standards-related activities which have occurred. The work of the Consortium in this area has served as a model across the Region and across content areas."

The Consortium assisted the entire Region in the development and refinement of mathematics and science standards and frameworks. The implementation process looks very different from one place to another, thus the Consortium supported a variety of models to engage local educators in identifying instructional programs to support the frameworks. In cases where appropriate materials did not exist, the Consortium provided technical assistance in support of adaptation and/or development. In Yap cases, there was a local decision to develop an entire first-language integrated instructional program. In other cases, such as Kosrae and American Samoa, the Consortium supported the development of materials to meet a relatively narrow need, such as marine education. In still other cases, there was a decision to build the instructional program around teacher-developed units. In all cases the Consortium provided assistance to increase the likelihood of successful implementation.

The development and dissemination of information and materials was an important part of these efforts. The Consortium disseminated materials produced by others to meet the needs of clients and, in instances where none existed, worked to develop materials. Clients found the materials disseminated by the Consortium to be useful in their improvement efforts. Sixty-one percent of them found that the materials received from the Consortium made either moderate or significant contributions to their work. Consortium-developed products, which reflected the educational needs and context of the Region, consistently received higher "usefulness ratings" than products from other sources.

VII. Assessing the Work of the Consortium

Use a variety of tools to assess mathematics and science education, including the impact of improvement efforts, to inform decisions, and to determine next steps so that by the year 2000:

- Those affected by Consortium activities are able to identify, describe, and assess the impact of this 5-year effort on their knowledge, capabilities, attitudes, and actions.
- There will be an expanded capacity to reflect on and actively use the assessment of impact to make choices and set next the steps to continue improvement efforts and expand mathematics and science literacy.
- There will be evidence to describe the quality and impact of mathematics- and science-reform initiatives.

Assessing Impact (Activities as proposed)

5.1 Implement the Project Evaluation and Monitoring Plan.
5.2 Document Impact on Students.
5.3 Document Impact on Teachers.
5.4 Document Impact on Schools and Communities.
5.5 Disseminate yearly program reports and feedback to national, regional, and entity stakeholders.

Approved Application References: Part 3 - pages 9 and 20. Appendices B and L.

The Consortium's efforts in the area of assessing impact were two-fold. Firstly, the Consortium worked with educators across the Region to increase the collection and utilization of data as a decision-making tool. Secondly, the Consortium assumed responsibility for conducting ongoing assessment of its efforts and their effectiveness for informing further work and for reporting purposes.

Data-Driven Decision-Making

The Consortium's second objective was to establish criteria and priorities for providing direct services in mathematics and science education. This included the development of expanded capabilities among educators in the Pacific to better enable them to thoughtfully establish and use criteria for decision-making. Activities supporting the achievement of that objective were closely linked to those supporting the expanded use of data in planning. The Pacific Consortium actively worked to incorporate data-driven criteria-based decision-making in its work. It also attempted to increase the use of similar decision-making processes among those with whom it works. PREL as a whole provided extensive assistance to DOEs and schools in the Region to strengthen information gathering and data collection between 1995 and 2000. There is some evidence of this taking place, particularly in the Marshall Islands

and Pohnpei. Impacts of interaction with the Consortium, as listed by a number of survey respondents, included increased strategic planning, more informed decision-making, and more thoughtful planning of instruction.

Efforts in this area culminated with the regional Pacific Science and Mathematics Determining Study. The Determining Study was designed to establish the status of the teaching and learning of mathematics and science at selected school sites across the Region. While the study focused on specific sites, it was anticipated that the sites within an entity would collectively provide insight into the progress being made towards achieving the goals set by standards-based education.

A secondary but very important goal of the study was to increase the capacity of M/S Team members and others to describe the status of the teaching and learning of mathematics and/or science in their schools and to use that information for decision-making. Each entity created a study team consisting of approximately four people. These included the M/S Team members, a member of the Consortium staff, and an individual selected by the chief school officer. The teams all attended a Study Team Formation Meeting in February 2000 to prepare for the work. The formation meeting included the review, use, and revision of the instruments and protocols to be used. The teams used all of the proposed instruments in actual schools as part of the training process. The M/S Team members of each cadre met in September 2000 following the data-collection phase of the study to discuss the analysis and use of the information collected and to consider the usefulness of similar efforts in other schools. These efforts built capacity in the team members to utilize informed decision-making to further standards-implementation efforts.

Documenting Consortium Work and its Effectiveness

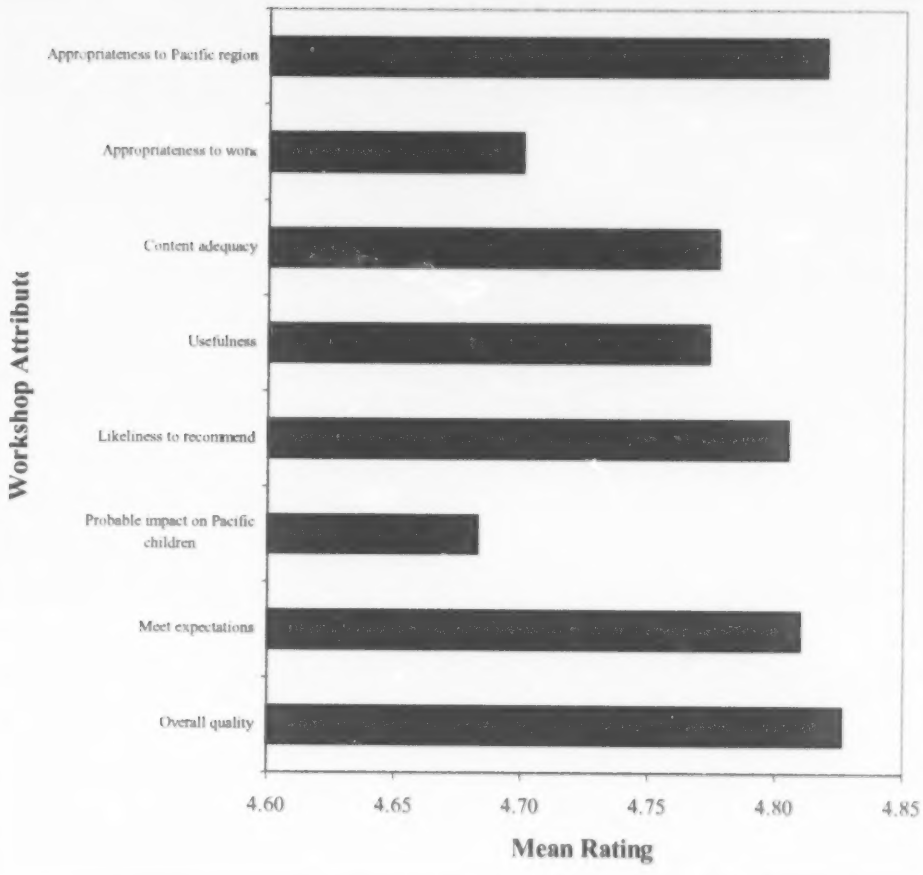
PREL Data Collection and Management Systems

The Consortium has documented and evaluated its work for both formative improvement and reporting throughout the project period. The data-collection and management systems utilized for these purposes incorporated the Eisenhower Network's Cross-Consortium Descriptive Database System (CCDDS) and PREL's Information Management System (IMS).

The CCDDS has served as the Eisenhower Network's national data-collection system throughout the funding period. The database describes each client-service activity in terms of participant affiliation and role (e.g., teacher, administrator, and policymaker), the length of the activity, type of service provided, content focus, contact method, and involvement of collaborators.

The IMS is an Internet-based management system designed by PREL in collaboration with WestED. PREL began developing IMS in 1998 and moved all organizational reporting to the system in October 1999. In addition to the data included for incorporation in the CCDDS, the IMS contains databases of

Figure 20: Mean Ratings of Workshops



clients, resources, collaborators, and activity evaluations. The cross-relational databases provided the Consortium with the tools needed to effectively follow-up with clients and collaborators for the purposes of determining long-term impact and improving the quality of services. The system has the added advantage of being Internet-based and accessible to staff, M/S Team members, and others associated with the work of the Consortium but not based at PREL's Honolulu office.

The post-workshop evaluation information that is part of the data-collection process is an important component of the Consortium's formative evaluation. This information, including anecdotal comments, contributes to the overall picture by describing the quality and appropriateness of services. These data are used to refine and improve services and inform the content and design of future work. Since the Consortium works with the majority of its clients over an extended period of time, individual activity reports and anecdotal information are very important to the design and delivery of future activities within projects. The work of the Consortium has consistently been rated as appropriate and useful (Figure 20).

Other Sources of Data

In addition to its internal data-collection and management processes, the Consortium has obtained information regarding the impact of its work from a variety of sources, including its school and workshop-facilitator reports and portfolios, M/S Team member interviews, the Eisenhower Mathematics and Science Consortia Program Interim Assessment, the Eisenhower Network's Cross-Consortia Client Surveys (CCCS) conducted in 1998 and 1999, and SRI's Eisenhower Mathematics and Science Education Regional Consortia Program Evaluation (summer and fall, 1998).

Collectively, these provide rich data for understanding and assessing the work of the Consortium. They describe the client-service activities of the Pacific Consortium and document its contribution to the improvement of mathematics and science education by assessing client perceptions of quality and impact.

Outcomes and Impact: Consortium Overall

Defining impact as "resulting in positive change," the Pacific Consortium has significantly impacted mathematics and science education in the U.S.-affiliated Pacific Region as a result of its work. The Consortium is seen as the umbrella organization for focusing mathematics and science-reform efforts (Interim Assessment) and enhancing educational improvement efforts in the Region (SRI). There are very few parts of the Region that have not been served by the Consortium in one way or another. Specific indications of impact related to the Consortium's objectives have been incorporated earlier in the report; this section presents information regarding the overall impact of the project over the 5 years.

The Pacific Standards for Excellence Series had a profound impact on science and mathematics education across the Region. The collaborative development of standards by educators from across the

Pacific was the first content-focused collaboration of this nature, and the resulting shared vision has changed regional and local perspectives and dispositions. The standards have created a shared set of beliefs about mathematics and science education, fostered discussions and planning, led to reforms in frameworks and curricula, been used as a basis for decision-making, and led to teaching improvements. These standards served as an umbrella for the work of the Consortium and many others during the 5-year period. When interviewed, M/S Team members indicated that the Pacific Standards and the shared vision imbedded in them provided a foundation for their entity-based improvement efforts. It was indicated that the standards informed their work and built commonalities that enabled collaboration.

In the areas of technical assistance and professional development, the SRI evaluation, Interim Assessment, and client surveys all found indications that the Pacific Consortium's work enhanced educational improvement in the Region. Clients valued the leadership and services provided by the Consortium. They express their belief that the Consortium is providing much needed services that would not otherwise be available given the declining economic situation and decreased funding for education across the Region. These beliefs were supported during the interviews of M/S Team members.

The Consortium believed that success could be measured in part by the ability to initiate efforts that further mathematics and science reform and then to step back and observe the building of entity-based capacity. This belief led the Consortium to involve stakeholders in all efforts to both inform the work and increase individual professional development. The M/S Team is an excellent example of this philosophy in action. These team members unanimously reported that their understanding of mathematics and science increased, their skills as professional developers improved, and their confidence as educational leaders has grown as a result of participating on the team. This claim is supported by comments from their respective supervisors and by changes in the way they work at home. The Consortium's belief in boosting local capacity led to the use of a variety of coaching models and, to a lesser extent, the more traditional trainer of trainers (TOT) model.

Interviews of M/S Team members, client surveys, the SRI evaluation, and the Interim Assessment all found that the Pacific Consortium was successful in supporting mathematics and science improvement in the Pacific. In fact, the M/S Team members agreed unanimously that the Consortium was meeting needs that would have been difficult or impossible for any other organization to fulfill. As one client stated, "The Consortium has brought hearts and minds together across the Region to improve education for future generations . . . and provided technical assistance and other support for the improvement process."

Progress Towards the GEPA Indicators for the Eisenhower Regional Consortia Program

The Pacific Consortium is very cognizant of the need to respond to the national GEPA Indicators for the consortia program as well as to local and regional needs. Following are the performance indicators for the Eisenhower Regional Mathematics and Science Education Consortia as of January 20, 1999, with performance data from the Pacific Consortium for indicators 1.1, 1.2, 1.3, 1.6, 1.7, 1.8, 1.9, 2.3, and 2.4. This subset of 9 out of the total 14 indicators contains those which are most closely aligned with the goals and objectives of the Pacific Consortium. The data reported as performance data is derived from the Cross-Consortia Client Surveys (CCCS) administered in the fall of 1998 (130 respondents) and fall of 1999 (102 respondents) and information from the Pacific Consortium Activity Database (PCAD) between March 1996 and February 2001.

Technical Assistance Indicators

1. Provide high-quality technical assistance (including planning assistance, training, facilitation of collaboration and networking, and other technical assistance.
   1.1 Alignment with standards. At least 80% of participants in Consortia technical-assistance activities will report that the content is explicitly aligned with national or state content and performance standards and/or is focused on assisting in the implementation of standards and practices related to their attainment.
      Respondents reporting explicit links between the activities they participated in and content and performance standards.
         1999 Baseline Data: (1998 CCCS) 87 %
         2000 Data: (1999 CCCS) 93%
   1.2 Intensity of technical assistance. At least 60% of Consortia technical-assistance activities will be 12 hours or more.
      Technical assistance activities 12 hours or more per Pacific Consortium Activity Database.
         1999 Baseline Data: (PCAD, January 1999) 56%
         2000 Data: (PCAD, February 2001) 55%
   1.3 Improvement in participants' practice. At least 80% of the teachers, administrators, and providers of professional development who participate in the Consortia's continuing technical assistance will report improvement in their practice
      Participants reporting the incorporation of new behaviors in their work.
         1996 Baseline Data: (SRI) 62%
         1999 Data: (1998 CCCS) 85% (53% reported extensive improvement, 32% moderate)
         2000 Data: (1999 CCCS) 92% (52% reported extensive improvement, 36% moderate)
   1.6 Participation by individuals who assist or train others. At least 80% of participants in Consortia trainer of trainer activities will go on to provide professional development or technical assistance based on the technical assistance they received from the Consortia.
      Participants in TOT type activities reporting that they had provided professional development based on the training they received.
         1999 Baseline Data: (1998 CCCS) 63%
         2000 Data: (1999 CCCS) 72%

1.7 Targeted services. At least 70% of the district and school staff who participate in the Consortia's continuing technical assistance will work in districts or schools with a majority of students who are Title I eligible.

Respondents working in districts or schools with a majority of students who are Title 1 eligible.

1999 Baseline Data: (1998 CCCS) 78%

2000 Data: (1999 CCCS) 78%

1.8 Volume of collaboration. At least 80% of Consortia activities will include collaborators from one or more stakeholder groups in planning, product development, and/or service delivery.

Consortium activities involving collaboration with one or more stakeholder groups.

1999 Baseline Data: (PCAD, January 1999) 78%

2001 Data: (PCAD, February 2001) 85 %

1.9 Impact on collaboration and networking. At least 80% of members of Consortia teams and networks will report that value was added in one or more of the following ways: strengthening relationships; increasing service coordination; increasing access to resources; or leveraging resources.

Members of Consortium teams and networks reporting value added as a result of the collaboration.

1999 Baseline Data: (1998 CCCS) 91%

2001 Data: (1999 CCCS) 94%

Dissemination Indicators

2. Disseminate information about promising and exemplary practices in mathematics and science education.

2.3 Dissemination. The total number of Consortia contacts with customers by print and/or hits on electronic sites will increase by 10% annually.

Apr 1996–Mar 1997: (PCAD, March 1997) 39,126 contacts by print. hits on electronic sites were not logged at that time.

Apr 1998–Jan 1999: (PCAD, January 1999) 24,325 contacts by print. 220,000 electronic contacts including e-mail, listservs and hits on electronic sites. This figure reflects hits at PREL's www.prel.org site between January 1 and November 30, 1998.

Jan 1999–Feb 2001: (PCAD, February 2001) 100,980 contacts made by print between February 1999 and February 2001 for an annualized total of 50,490. 124,698 electronic contacts including e-mail, listservs and hits on electronic site. Hits include only those on the mathematics and science sections of PREL's website.

2.4 Utility. A majority of recipients of Consortia and ENC products and resources will report that they have contributed to improving their work.

Respondents indicating that Consortia and ENC products they received contributed to improving their work.

1999 Baseline Data: (1998 CCCS) 59%

2001 Data: (1999 CCCS) 78%